THE VEDIC CALENDAR

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R. Shamasashtry

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Editor's Note

When and how the counting of time started, it is difficult to predict exactly. The calculation of time all over the world was constantly related to the movements observed among celestial elements. *Sun* governs the most important factor of time.

This book not only proves the existence of a calendar during Vedic times, but also collects various forms scattered in Sūtras and Brāhamaṇas.

The various systems of calendar described in the Véuas and Sūtras are not the result of an observation of the heavens in a day, but are the outcome of the experience gained and adjustments made by many successive calculators of time. The author has presented how Vedic poets kept a systematised calendar based upon scientific principles. The hymns from Sūtras, Atharvavéda, Yajurvēda Taithiriya, Saṁhitā, Ṛgvēda, Samvēda etc., have been refered to confirm the technical expression of the Vedic poets implaying the intercalary nature of those days.

Even though the Western calendar has come in daily use, still for calculating the dates for religious practices, these regional calculations are still in use.

G.P.

Contents

The Intercalary Month

The term "Vedic Calendar" may appear at the outset to be an anachronism, for the reason that there are no clear references to any kind of calendar in the Vedas proper. Even in the Brāhmaṇas, references to a calendar are so vague that it is hardly possible to form a clear conception of the precise nature of the calendar that was in use. But coming to the Sūtras, especially those of the Sāmavēda, we find precise data to determine the various systems of calendar in observance during the Sūtra period. One might, therefore, be led to think that the term "Sūtraic Calendar" would be preferable to that of "Vedic Calendar." But it should be borne in mind that the various systems of calendar described in the Sūtras are not the result of an observation of the heavens in a day, but are the outcome of the experience gained and adjustments made by many successive calculators of time. Nor are allusions to a calendar altogether wanting even in the Vedas. The description of the New Year's Day as occurring on the Ekāshṭaka day, i.e., the eighth day of the dark half of the month of Magha (corresponding to December-January) in the times with which we are dealing, as well as the distinct references to a thirteenth month which must necessarily have been an additional month intercalated for the purpose of keeping the beginning of the year more or less close to its natural time, go a long way to prove that

the Vedic poets kept a systematised calendar based upon scientific principles. The beginning of the year on the Ekāshtaka day is thus described in the Atharvavēda, III 10:—

"(1) She first shone out; she became a milch-cow at Yama's; let her, rich in milk, yield (*duh*) to us each further summer!

"(2) The night which the gods rejoice to meet as a milch-cow coming unite them, which is the spouse (*patnī*) of the year, let her be very auspicious to us!

"(3) Thou, O night, whom we worship as model (*pratimā*) of the year; do thou unto our long-lived progeny with abundance of wealth.

"(4) This same is she that first shone out; among these other ones she goes about, having entered; great greatness s are within her; the bride (*vadhu*), the new generatrix hath conquered.

"(8) Hither hath come the year, thy spouse, O sole Ashṭakā; do thou unite our long lived progeny with abundance of wealth!

"(13) Thou whose son is Indra, whose son is Sōma, daughter art thou of Prajāpati; fully thou our desires; accept our oblation!"

A similar hymn with important variations is also found in the Yajurvēda, Taittirīyā-Saṁhitā, IV. 3. 11:

इयमेव सा या प्रथमा व्यौच्छदंतरस्यां चरति प्रविष्टा ।
वधूर्जजान नवगज्जनित्री त्रय एनां महिमानस्सचंते ॥ १ ॥

छंदस्वती उषसा पेपिशाने समानं योनिमनु संचरंति ।
सूर्यपत्नी विचरत: प्रजानती केतुं कृण्वाने अजरे भूरिरेतसा ॥ २ ॥

ऋतस्य पंथामनु तिस्र आगु स्त्रयो घर्मासो अनु ज्योतिषागु: ।
प्रजामेका रक्षत्यूर्जमेका व्रतमेका रक्षति देवयूनाम् ॥ ३ ॥

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ऋतूंस्तन्वते कवयः प्रजानतीर्मध्ये छंदसः परियंति भास्वतीः॥ ६ ॥

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अस्य सुमतौ यथा यूयमन्या वो अन्यामति मा प्रयुक्त ॥ ९ ॥

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या प्रथमा व्यौच्छत्सा धेनुरभवद्यमे ।
सा नः पयस्वती धुक्ष्वोत्तरामुत्तरां समाम् ॥ १३ ॥

शुक्रर्षभा नभसा ज्योतिषागाद् विश्वरूपा शबलीरग्निकेतुः ।
समानमर्थं स्वपस्यमाना बिभ्रती जरामजर उष आगाः ॥ १४ ॥

ऋतूनां पत्नी प्रथमेयमागादह्नां नेत्री जनित्री प्रजानाम् ।
एका सती बहुधोषो व्युच्छस्यजीर्णा त्वं जरयसि सर्वमन्यत् ॥ १५ ॥

"(1) It is she that first shone out; having entered into this (*earth*), she goes about; (*like*) a bride, newly married (*to the* New Year), she has become the generatrix (*of the days that follow*); three are the great lights that associate with her.

"(2) Extolled in metres, these two shining dawns, coming out of the same womb, and being the wives of the sun, go about all-knowing, making a flag, free from old age, and impregnated with abundant seed.

"(3) Three dawns have reached the path of the sacrifice; three lights [the fire, the sun, and the moon] have also approached it; of them, one protects the offspring, one the vigour, and one the rite of those who like to please the gods.

"(4) She who is the fourth has passed into the four sets of Sāma-chants [nine-versed. fifteen-versed, seventeen-versed, and

twenty-one-versed, chants], maintaining the two wings [halves] of the sacrifice [*i.e.*, the year] as known to the sages, and giving rise to the Great Litany composed of Gāyaṭrī, Tṛishṭubh, Jagatī, and Anushṭubh metres; and she has preserved this heaven [the solstice].

"(5) With five (*days*) the Creator has made this; he has also created five and five sisters of them; taking various forms and being clothed in sacrificial splendour, five of them run with great speed.

"(6) Thirty sisters [days] partake of the rite, spreading out the same flag; they make the seasons; being wise and all-knowing and residing in the metres, they go about with great splendour.

"(7) Clothed in splendour, this shining night takes to herself the rites addressed to the sun above : even the various kinds of beasts, on awakening, see her on the lap of this mother (the earth).

"(8) This eighth day, bearing the troubles of pregnancy, has brought forth this great Indra; with his help the gods repelled the enemies: in virtue of his own might, he has become the destroyer of the Asuras.

"(9) O sole Ashṭakas. ye gave a sister to me hitherto without a sister; ye speak the truth; listen to this prayer: just as ye are pleased with the behaviour of this (*Indra*), so may ye be pleased with mine; do not send me away to any one else!

"(10) This all-knowing dawn stepped into my mind and has taken a firm hold of it; just as ye are pleased with this (*Indra*), so may ye be pleased with me; do not send me away to any one else;

"(11) The five mornings, the five milkings, and the five seasons follow the cow with five names; the five quarters regulated by the fifteen-versed chant and possessed of the same characteristics as

the five mornings follow this single light [the dawn].

"(12) (*Of the five mornings*) the first is the womb of the dawn: one bears the magnificence of the waters; one presides at the rites addressed to the sun; one presides over the heat: and one the sun controls.

"(13) She that first shone out has become a cow at Yama's; let her, rich in milk, yield to us each further summer!

"(14) Foremost among the lights, clothed in brilliant splendour, has arrived this illuminating dawn with various colours, like a flag of the sacrificial fire; O ever youthful dawn, conducive to the performance of unchanging rites, and grey with old age, thou hast arrived!

"(15) The wife of the seasons, the first (*dawn*) has arrived leading the days and being the mother of creatures; though one, thou hast become many; free from old age, thou causest the rest to grow old."

Likewise the Tāṇḍyamahābrāhmaṇa describes the Ekāshṭaka as the wife of the year :—V. 92.

एषा वै संवत्सरस्य पत्नी यदेकाष्टका. एतस्यां वा एतां रात्रिं वसति. साक्षादेव तत्संवत्सर-मारभ्य दीक्षंते.

"What is called the Ekāshṭakā (*day*) is the wife of the year, when the night of this day arrives, (*prajāpati*) lies with her. Hence, commencing with the (*true*) beginning of the year, (*sacrificers*) observe the rite of initiation."

The important points to be particularly noticed in the above passages are (1) the beginning of the year, probably solar, on the eighth day of the dark half of the month Māgha; (2) the designation of this day by such names as 'a cow,' 'dawn,' 'Prajāpati's daughter, and 'Sūryā'; (3) the association or a kind of secret marriage of the dawn with three lights, the fire, the moon, and the sun, as pointed out by Sāyaṇa in his commentary

on verse 1; (4) the birth of the days of the following year or cycle of years, as well as of Indra and Sōma from the marriage of the dawn with the sun; (5) the celebration of the dawn by the four well-known Sāma-chants; namely, the nine-versed chant, the fifteen-versed chant, the seventeen-versed chant, and the twenty-one-versed chant, each of which is, as we shall see, intended to signify as many intercalary days as the number of verses contained in it; (6) the destruction of enemies and Asuras brought about by Indra, the son of the dawn.

As regards the first point, it is true that we are told nowhere in the Vēdas themselves that the word Ekāshṭaka means the eighth day of the dark half of the month of Māgha; still, on the authority of Āpastamba and other Sūtra-writers, who have defined it as such, we may take in to mean that particular day. From the next three points we have to understand that at, the commencement of every year or cycle of years, it was the usual custom with the Vedic poets to celebrate symbolical marriage of the New Year's Day with the sun in order to enable the new year to beget its 720 children,[1] *i.e.*, its days and nights, or in other words, to perpetuate an auspicious flow of time for themselves. This seems to be the sum and substance of the celebrated marriage hymns,[2] in which the marriage procession of Sūryā or the dawn to be wedded to the sun is the subject of a long and mystic description, and which are even now recited on the occasions of marriages performed as a rule after the winter solstice and before the summer solstice. The recognition of the dawn first by Sōma, the moon, next by Gandharva,[3] one of the 27 *nakshatras*, then by Agni, and lastly by men, seems to signify the association of the dawn first with the synodic lunar year of 354 days, next with the sidereal lunar year of 351 days containing 13 months each of 27 days corresponding to the 27 *nakshatras* or Gandharvas, then with the Sāvana year of 360 days dedicated to the sacrificial fire-god from whom the dawn or the twenty-first day, based upon the difference between the Sāvana year and the Julian solar year of 365¼ days, is believed to have come under the protection or observance of men. The fact of making the dawn the object of praise in the Chatushṭōmas or four sets of Sāma-chants seems to render probable the above

explanation of the two obscure verses of the marriage hymn.[4] The five mornings which are said to precede the brilliant dawn in verse 11 seem to be five days added after the end of the Sāvana year. As regards the destruction of enemies and Asuras by Indra, we shall presently see that they are not real enemies or Asuras, but intercalary days regarded as such.

Thus, while the Yajurvēda connects the mornings and the mystic cows with the Chatushṭōmas, thereby implying the final number of intercalary days to be twenty-one, their number is distinctly stated as three times seven in the Sāma-vēda.

तेऽमन्वत प्रथम नाम गोनाम्
त्रिस्सप्त परमं नाम जानन ।
ता जानतीरभ्यनूषत क्षा:
आविर्भुवन्नरुणीर्यशसा गाव: ॥

"First they (*the sages*) came to know the sacred
name of the cows; they came to know the
sacred names to be three times seven;
knowing them, they extolled the morning (*kshāḥ*):
then the red cows became famous."

There are two more verses which express the same idea :—

अयं पुनान उषसो अरोचयत्
अयं सिन्धुभ्यो अभवदु लोककृत् ।
अयं त्रिस्सप्त दुदुहान आशिरम्
सोमो हृदे पवते चारुमत्सर: ॥ Sāma, ii, 1, 17, 3.
त्रिरस्मै सप्त धेनवो दुदुह्रिरे
सत्यामाशिरं परम् व्योमन् ।
चत्वार्यन्या भुवनानि निर्णिजे
चारूणि चक्रे यदृतैरवर्धत ॥ Sāma, vi, 2, 2, 7.

"He, being purified, hath made the mornings shine;
and it is he who gave the rivers room to flow;
making the three times seven pour out the milky stream,
Sōma, the cheerer, yields whatever the heart finds sweet."

"The three times seven milch-kine in the loftiest heaven have for this Sōma poured the genuine milky draught; four other beauteous worlds hath he made for his adornment when he waxed in strength through holy rites."

For reasons to be pointed out further on, I presume that the four worlds referred to in the above verse are four solar years, and that the twenty-one cows or mornings are the intercalary days made up of the four times five days and a quarter which is the difference between a Sāvana and a solar year. I do not, however, contend that it is clear from the above passages themselves that the twenty-one cows or mornings are intended to signify so many intercalary days and intercalary days alone. Still, I believe that scholars will agree with me in holding that, so far as the beginning of the year on the Ekāshṭaka day is concerned, these passages leave no doubt whatever. The Ekāshṭaka day is clearly a lunar day; and the year that was practically observed by the Vedic poets was the Sāvana year of 360 days. The number of days from one Ekāshṭaka or the eighth day of the dark half of the month of Māgha to the next Ekāshṭaka is 354. Accordingly, if the Sāvana year of 360 days, having once begun (on the Ekāshṭaka day, is to begin again, on that same day, there must necessarily be an adjustment of the difference of six days between the lunar and the Sāvana years by the addition of one month to the lunar year in every five years. If instead of the Sāvana year, they adopted a solar or a sidereal year, even then they must necessarily have adjusted the respective differences between the lunar and the solar or between the lunar and the sidereal years by intercalation in the form of days or months. Accordingly, we find clear references only in to a thirteenth intercalary month not the Yajurvēda and the Atharvavèda but also in the Ṛigvèda. The Ṛigvéda i, 25, 8, thus alludes to the intercalary month :—

वेद मासो घृतव्रतो द्वादश प्रजावत: । वेदा य उपजायते ॥

"He, who, accepting the rites (*dedicated to him*), knows the twelve months and their productions, and that which is supple-

mentarily engendered."

In his translation of the Ṛigvéda, Professor H. H. Wilson remarked as follows:—

"वेद य उपजायते, who knows what is *upa*, additionally or subordinately produced. The expression is obscure, but in connection with the preceding, वेद मासो द्वादश, who knows the twelve months, we cannot doubt the correctness of the scholiast's conclusion, that the thirteenth, the supplementary or intercalary month of the Hindu luni-solar year, is alluded to; that 'the thirteenth or additional month which is produced of itself, in connection with the year', 'यस्त्रयोदशोऽधिमासउपजायते सवत्सरसमीपे स्वयमेवोत्पद्यते'. The passage is important, as indicating the concurrent use of lunar and solar years at this period and the method of adjusting the one to the other.

Notwithstanding Sāyaṇa's interpretation of the word *upajayate* in the sense of 'a supplementary month.' it is doubtful whether the word indicates a complete intercalary month or an intercalated period less than a month; for we shall presently see that before the custom of adjusting the lunar and the solar reckoning by the addition of a complete month came into vogue, the usual practice was to adjust them by adding as many days as formed the difference between any two kinds of years or sets of years. Still, it is certain that some sort of intercalation, either in the form of a month or in the form of a period less than a month, is what is implied in the above verse of the Ṛigvéda. But coming to the Atharvavéda, we see therein a clear description of a thirteenth intercalary month :

अहोरात्रैर्विमितं त्रिंशदंगं त्रयोदशं मासं यो निर्मिमीते ।
तस्य देवस्य क्रुद्धस्यतदागो य एवं विद्वांसं ब्राह्मणं जिनाति. ॥

"He who measures the thirteenth month, fabricated of days and nights, having thirty members—against that god, angered, is this offence." A. V., XIII, 3.8.

सनिस्रसो नामासि
त्रयोदशो मास इन्द्रस्य गृहः ।

"Weakling by name art thou, the thirteenth month, Indra's house." A. V., v. 6. 4.

In the Krishna-Yajurvèda, i. 4. 14, the twelve months together with a thirteenth intercalated month are thus enumerated :

मधुश्च माधवश्च शुक्रश्च शुचिश्च नभश्च इषश्चोर्जश्च सहश्च सहस्यश्च तपश्च तपस्यश्चो-पयामगृहीतोऽसि संसर्पोऽसि ग्रहस्पत्याय त्वा.

"Thou art the month of Madhu,[a] the month of Mādhava, the month of Sukra, the month of Suchi, the month of Nabhas, the month of Nabhasya, the month of Isha, the month of the Urja, month of Sahas, the month of Sahasya, the month of Tapas and the month of Tapasya; and thou art caught hold of in a wooden vessel; thou art the month Samsarpa [a creeping month]; and thou art the receptacle of sins."

The Brāhmaṇa portion contained in the Krishna-Yajurvéda, vi. 5, 3, 12, comments on this passage as follows:—

प्रसिद्धमेवाध्वर्युर्दक्षिणेन प्रपद्यते प्रसिद्धं प्रतिपस्थातोत्तरेण. तस्मादादित्यऽषण्मासो दक्षिणे-नैति षडुत्तरेण उपय मगृहीतोऽसि ससर्पोऽस्यंहस्पत्याय त्वेत्याहास्ति त्रयोदशो मास इत्याहुस्तमेव तत्प्रीणाति.

"Clearly does the Adhvaryu first go to the south; clearly the Pratiprasthātri priest to the north. Hence does the sun go to the south for six months; and to the north for six months. He says : 'Thou art caught in a wooden vessel'; thou art Samsarpa [a creeping month] and a receptacle for sins.' They say that there is also a thirteenth month; it is that thirteenth month which he pleases thereby."

The symbolical practice connected with this passage is this:— The Adhvaryu priest fills thirteen wooden vessels with Sōma-juice; and with the help of another priest, called Pratiprasthātri, he makes offerings therefrom to the seasons. While performing the rite, the Adhvaryu goes to the south and the Pratiprāsthāṭri to the north, imitating the southern and northern movements of the sun respectively. As will be seen, it was in the middle of

the year during the summer or the winter solstice, accordingly as the year began with the winter or the summer solstice, that the intercalary period was inserted, delaying the sun's turning movement so long and occupying that period in performing the initiatory rites. Hence the reference in this passage to the sun's northern and southern movements, and to the thirteenth month during which the commencement of those turning movements is delayed. The fact of representing the months by Sōma-vessels is in the Maitrāyaṇiya Saṁhitā, iii, 10, 4, 5.

द्वादश पात्राण्युपांशुसवनस्त्रयोदशं यत्तन्मीमांसंते पात्रा३न्नपात्रा३मिति मीमांसंते हि त्रयोदशं मासं मासा३न्नमासा३ इति.

"Twelve are the vessels; the pressing stone, called *Upāṁśusavana* is the thirteenth; the discussion they hold, by asking whether there ought to be a vessel or no vessel (*to represent a thirteenth month*), is a discussion as to whether there is a thirteenth month or no thirteenth month."

Regarding the scrificial function observed during a thirteenth month, the Tāṇdyamahā Brāhmaṇa x, 3. 2, says:—

पिता नोऽरात्सीदिति मासा उपासीदन् । ते दीक्षयैवाराध्नुवन् । उपसत्सु त्रयोदशमदीक्षयन् । सोऽनुव्यमभवत् . तस्मादुपसत्सु दिदीक्षाणोऽनुव्य भवत्येव च हि त्रयोदशं मासं चक्षते नैव च.

"The months observed the vow of *Upasads* [sessions] with the intention that their father [the year] might prosper. They, however, prospered merely by observing the initiatory rites, and initiated the thirteenth month during the period of the vow of *Upasads* [sessions]. Therefore the thirteenth month became their follower. Hence whoever undergoes the rite of initiation during the period of the vow of *Upasads* [sessions] becomes the follower (*of the rest of the priests*). Accordingly they declare a thirteenth month as existent and also as non-existent."

Again, the Maitrāyanīya-Saṁhita i. 5. 5. 6, says

अग्नीषोमीयया त्रयोदशी उपस्थेयोऽस्ति.
मासस्त्रयोदशः तमेवैतयाप्त्वावरुंधे.

"The thirteenth lunar day is to be propitiated by the immolation of a beast sacred to Agni and Sōma. There is the thirteenth month; it is that thirteenth month which he catches hold of by this offering."

These and other references to the New Year's Day and the thirteenth month intercalated solely for the purpose of keeping the seasons or the months in their proper places in the year, are enough to show that the Vedic poets kept a calendar with far more scientific precision than we are pleased to credit them with. Whether we will or not, the fact cannot be denied that the idea of a thirteenth month, i.e., an intercalated month, could not have dawned upon the mind of the Vedic poets unless they had been quite familiar with the true lengths of several kinds of years. There is also reason to believe that, before the system of adjusting the difference between any two kinds of years by the insertion of an intercalary month was begun, the practice was to adjust them by adding sets of intercalary days, such as 9, 11, 12, 21, and so on. That such was the custom, is clear from the following passage of the Kaṭhaśākhā-Brāhmaṇa quoted in the *Smṛititattva*.[6]

अर्धमासा वै अधस्तात्संत: अकामयत मासास्स्यामेति. ते द्वादशाहं ऋतुमुपायन् त्रयोदशं ब्राह्मणं कृत्वा तस्मिन् मृष्टवा उदतिष्ठन् तस्मात्सोऽनायतन: इतरानुपजीवतीति तस्माद्द्वादशाहस्य त्रयोदशेन ब्राह्मणेभ भविनव्यमिति कठशा. खाब्राह्मणम् .

अस्थार्थो जयस्वामिना व्याख्यात:—

ते चार्धमासा त्रयोदशं मलमासं ब्राह्मणं कृत्वा द्वादशाहं ऋतुमापायन् उपाहृतवंत: तस्मिन्मलमासे मृष्टवा संमार्ज्य किमित्याकांक्षाया अरातीरित्यध्याहृयते. अराती: पापानि संमार्ज्य उदतिष्ठन् . पापभारशून्या उत्थिता अभवन्नित्यर्थ: तत्र पापनिर्मार्जनार्थवादात् संभवत्कालानंतरं कर्म तत्र न कर्तव्यम् न तु निरवकाशमिति अर्थवादात् विधिकल्पनाया: प्रतीतिबाधनैर्बोचित्यात् . अतो नित्यनैमित्तिकशांतिकादे: मलमासेन पर्युदासं: सोऽनायतन इति नाप्यस्य चैत्रादिवत प्रतिनियतस्थानमित्यर्थ: इतरानुपजीवतीति मासांतरेषु चंद्रक्षयवृद्धिभ्य. तस्योपजननात् .

'Being at a lower level [*i. e.*, being less than a month], the half-months desired that they might grow into months. They approached the twelve days' sacrifice. Having appointed a

Brāhmaṇa as a thirteenth priest (in addition to the twelve priests] and having washed off (*the sins*) on him, they got up. Hence it is that he [the thirteenth month or the priest who represents it] is homeless and dependent for his existence upon others. Hence there ought to be a thirteenth Brāhmaṇa priest in every twelve days' sacrifice. This is a passage from the *Brāhmaṇa* of the Kaṭha School.

"This passage is thus commented upon by Jayasvāṇin:— Having represented the thirteenth, 'dirty,' month by a Brāhman priest, those half-months collected the twelve-days' sacrifice, [i. e., converted it into a month's sacrifice]. Having washed off in that 'dirty' month,—if it is asked what was that which they washed off on the 'dirty' month, we have to understand the word *arāti*, 'enemies'—having washed off the enemies, i.e., the sins, they got up. i e., they rose up free from the burden of sin. From the descriptive statement of washing off the sins, it follows that the sacrificial performance which can possibly be observed in the subsequent month should neither be undertaken during the 'dirty' month nor be given up. The inference of a rule from a descriptive statement is reasonable inasmuch as the sense of the descriptive statement can otherwise have no application whatever.' Hence the performance of obligatory, casual, expiatory, and other religious rites is prohibited in a 'dirty' month. 'It is homeless' : i e., like Chaitra and other months, it has not a fixed place of its own in the year. 'Dependent for its existence upon others, i.e., the thirteenth month comes into existence owing to the waxing and waning of the moon in the intervals of months."

The meaning of the above passage is this :—Giving up a practice of adding twelve days to the synodic lunar year of 354 days in order to adjust it to the sidereal solar year of 366 days, the Vedic poets allowed the twelve days to accumulate to the extent of a month in the course of two and a half years, and then performed their sacrifice at the close of the thirteenth month with thirteen priests, of whom the thirteenth priest represented the thirteenth month, the 'dirty' month, and took

up the sins of the sacrificer for the gold that was presented to him.

In the *Aitarēya-Brāhmaṇa*, i, 12, the thirteenth priest is called Sōma-vikrayin, 'seller of Sōma.' This passage, with a brief commentary upon it by Raghunandana Bhattacharya, the author of the *Smrititattva*, runs as follows.[8]

प्राच्यां दिशि वै देवाः सोमं राजानमक्रीणंस्तस्मात्प्राच्यां दिशि क्रीणते त्रयोदशान्मासादक्रीणं स्तस्मात्त्रयोदशो मासो नानुविद्यते पापो हि सोमविक्रयीति. अस्यायमर्थः :

यतोऽधिमासस्सोमविक्रयी अतोऽसावितरमासवन्नानुविद्यते. विद्यमानोऽपि कर्मानर्हत्वादसन्निवेत्यर्थः सोमविक्रय्यपि ऋत्विगंतरवत.

"The gods bought the king Sōma in the eastern direction. Thence he is (*generally*) bought in the eastern direction. They bought him from the thirteenth month. Thence the thirteenth month is found unfit (*for any religious work to be done in it*); a seller of Sōma is (*likewise*) found unfit (*for intercour e*), for such a man is a defaulter." The meaning of the passage is, this :-"Because the intercalated month is the seller of Sōma therefore it has no proper existence like other months. Although it has its own existence, it is yet regarded as having no proper existence inasmuch as no rites are performed in it. The seller of Sōma is like other priests employed for the performance of sacrifice."

As regards the sinful nature of intercalated months, the author of the *Smrititattva*, quotes the following passage[9] :--

वत्सरांतर्गत. पाप यज्ञाना फलनाशकृत् ।
नैऋतैर्यातुधानाधैस्समाक्रांतो विनामक: ॥
इत्यादि ज्योतिश्शास्त्रे.
विरुद्धनामको विनामक: कुत: मलिम्लुचादिनामकत्वात्.

"(*The intercalated month*) contained in the body of the year is sinful, is destructive of the good results of sacrifices, is infested by Nairrita, Yatudhana, and other evil spirits, and is of a disagreeable name. This and other passage are found in astro-

logical works. The word *vināmaka* means that which has a disagreeable (name for it has Malimlucha and other *disgusting*) names."

The three passages quoted above throw a flood of light on the nature of the conception which the Vedic poets entertained regarding the intercalary days and months. We have to understand the three important points specified in these passages :—

(1) At first the Vedic poets used to adjust their lunar year with the sidereal solar year by adding twelve days to the former, but in the course of time they gave up that custom and began to intercalate one month to every third lunar year.

(2) Instead of performing any sacrifice during the intercalated period, they spent that period in performing such accessory rites as are called *Upasad* or sessions and *Dikshā* or rites of initiation.

(3) They regarded the intercalated days as being infested by evil spirits and enemies. It is therefore. probable that the apparent acts of sorcery undertaken in connection with every kind of sacrifice in order to drive out or to destroy 'those who hated the poets and whom the poets hated, are acts intended to symbolise the fact of getting rid of an intercalated period. Since an intercalated period is regarded, not only as being burdened with dirt or sin, but also as being infested by Varuna, Nirriti, and other good or evil spirits with nooses in their hands to bind their victims, it is probable that, during an intercalated period, the Vedic poets regarded themselves, not only as being burdened with sin, but also as being bound with the noose (*pāsa*) of Varuṇa or Nirriti. It also follows that the removal of sin or of Varuṇa's fetters at the close of a period of twelve or twenty-one days, is a technical expression of the Vedic poets implying the intercalary nature of those days. The removal of guilt at the close of the twelve intercalated days is thus referred to in the *Aitareyà-Brahmana*, IV. 4, 24.

त्रयश्च वा एते त्र्यहा आदशममहरादावीतरात्रो यद्द्वादशाहो द्वादशाहानि दीक्षितो भवति. यज्ञिय एव तं भवति द्वादश रात्रीरुपसद उपैति. शरीरमेव तासिद्धुनुते द्वादशाहं प्रसुते भूत्वा शरीर धुत्वा शुद्धः पूतो देवता अप्येति. य एवं वेद षट्त्रिंशदहो वा एष यद्द्वादशाहः।

"The Dvādaśāha consists of thrice three days together with the tenth day and two Atiratra days. After having undergone the ceremony of initiation during twelve days one becomes fit for performing the sacrifice. During the twelve days he undergoes the *Upasad* or the vow of fasting. By means of them he shakes off all guilt from his body. He who has such a knowledge becomes purified and clean, and enters the deities after having, during (*these*) twelve days, been born anew and shaken off (*all guilt*) from his body. The Dvādaśāha consists (*on the whole*) of thirty-six days."

The thirty-six days referred to in this passage are three sets of twelve days each, constituting the difference between three lunar and three sidereal solar years. The *Atharvavéda*=(Rig. v. vii. 103. 1.) IV. 15. 13, al·o speaks of the twelve days' vow as follows :—

संवत्सरं शशयाना ब्राह्मणो व्रतचारिणः ।
वाचं पर्जन्यजिन्वितां प्रमंडूका अवादिषुः ।

"Having lain for a year, (*like*) Brahmans performing a vow, the frogs have spoken forth a voice quickened by *parjanya* [the raining clouds].

So also the same says IV. 11. 11 :—

द्वादश वा एता रात्रीर्व्रत्या आहुः प्रजापतेः ॥
तत्रोप ब्रह्म यो वेद तद्वा अनडुहो व्रतम् ॥

"Twelve, indeed, they declare those nights of the vow of Prajāpati; who so ever knows the *Brahman* within them—that verily is the vow of the draught ox."

The release from Varuṇa's fetters at the close of twenty-one days is thus referred to in the *Atharvaveda*, iv. 16. 6

ये ते पाशा वरुण सप्त सप्त त्रेधा तिष्ठंति विषिता रुशंतः ।
सिनंतु सर्वे अनृतं वदंतं यः सत्यवद्यति तं सृजंतु ॥

"What fetters of thine, O Varuṇa, seven by seven, stand

triply relaxed, shining—let them all bind him that speaks untruth; whoso is truth-speaking, let them let him go."

I presume that the expression of three times seven milch kine pouring their milky draught, as referred to in the two verses of the *Sāmavēda* quoted above, implies the same idea as that of an intercalated period of twenty-one days. From the consideration of these and other similar passages too numerous to be quoted here, we may conclude that expressions such as 'the milking of the kine', 'the destruction of evil spirits or of enemies, and the release from the fetters of Varuṇa or of Nirṛiti, are Vedic expression implying the passing off of an intercalated period. I think that the symbolical acts of cutting off the branch of a Palāśa tree, and of separating the calves from the cows for the purpose of milking them during the night, and of destroying the evil spirits and enemies, as described in the very beginning of the Black Yajurvēda, are also meant to signify the passing off of an intercalated period. Among the Chinese the twelve months of the year are called the twelve branches; and it is probable that the Vedic poets, too, called the months, whether ordinary or intercalary, by the name of *śākhās* or branches. As already pointed out in the above pages and also in my essay entitled *Gavām-Ayana*: the Vedic Era, published in 1908, the term 'cow' is a name given to the New Year's Day as well as to the intercalated day; and her 'calves' must therefore mean the days of the subsequent year or cycle of years. We have also seen how the symbolical act of burning the evil spirits and enemies signifies the passing off of an intercalated period. Accordingly the first two *Anuvāks* or paragraphs of the first *kāṇḍa* of the Black Yajurvēda may possibly refer to the cutting off of an intercalated branch or month, and to the separation of some New Years' Days or bissextile intercalated days, termed 'cows', from their calves or the consecutive days of the subsequent year or cycle of years. In order to see whether the passage gives this meaning or not, it is necessary that we should examine the interpretation given to it by Bhaṭṭa Bhāskara and other commentators. The passage runs as follows, i. 1.1 :—

इषे त्वोर्जे त्वा वायवस्थोपायवस्थ देवो वस्सविता प्रार्पयतु श्रेष्ठतमाय कर्मणे आप्याय-

ध्वमघ्निया देवभागमूर्जस्वती: पयस्वतीरनमीवा अयक्ष्मा मावस्स्तेन ईशत माघशंस: रुद्रस्य हेति: परि वो वृणक्तु ध्रुवा अस्मिन्गोपतौ स्यात बह्वीर्यजमानस्य पशून्पाहि (1). यज्ञस्य घोषिदसि प्रत्युष्टं रक्ष: प्रत्युष्टा अरातय:,

In accordance with the commentary of Bhaṭṭa Bhāskara and others on these passages, they can be translated thus:--

"O Branch, thou art for *isha* [food], and for *ūrja* [strength]; O calves, ye are swift runners like the wind, and ye come back again, O cows, may the bright sun lead you for the purpose of our best sacrificial rites; O inviolable cows; yield the share of the gods, ye who are possessed of strength, milk, and calves, and who are free from consumption and other diseases. May the thief have no power over you, may the slaughterer not touch you; may the thunderbolt of Rūdra quit you on all sides; be ye firm in the possession of this cowherd; preserve ye the numerous cows of the sacrificer; O sword, thou art the announcer of the sacrifice; burnt is the devil and burnt are the enemies.

Here the sacrificer is required to repeat the first four words of the original, and to cut off a branch of the Palāśa tree for use in the sacrifice. The next four words are addressed to calves which are to be separated from their mothers, the cows. The following sentences up to 'burnt is the devil' are addressed to cows. Then comes the symbolical act of burning the evil spirits and enemies. These symbolical acts, which are usually performed by sacrificers in connection with all full-moon and new-moon sacrifices, appear to render the explanation of the commentators plausible and perhaps representative of the only meaning intended by the poet. But when we try to make the detached thoughts and acts into a connected whole, we feel the difficulty. So long as we accept the interpretation of the commentators, we fail to understand the aim of the poet who gave expressions to these thoughts and devised the symbolic acts: the thoughts and acts are so disconnected that they appear to have originated in some disordered mind. But if we take the 'branch' in the sense of an intercalated month which is to be placed between the months of Isha and Urja (Āśvina and Kārttika) and is to be symbolically burnt as an evil spirit and

an enemy, and if we take the calves as the days of an ordinary year whose wife is elsewhere said to be the eighth day of the dark half of the month of Māgha and is called a cow bringing forth the days or calves of the next year, the disjointed thoughts arrange themselves into a connected whole. It is probable that it was the lack of proper astronomical terms to designate the various parts of the year that led the Vedic poets to talk of them in terms of the branches of a tree and cows and calves. Whether or not the meaning of the first two paragraphs of the *Krishṇa-Yajurvéda* is, as I have presumed it to be, this much is certain, that the Vedic poets were quite familiar with various kinds of years and knew how to adjust them with each other, and that the detailed description of calendars given in the Sūtras is but a copy of Vedic calendars and not a later invention.

FOOT NOTES

[1]R. V. i. 164 10, 11.

[2]R. V. x, 85; and A. v. xiv, 1, 2.

[3]*Vājasaneyasamhitā* 18, 40; and also *Taittirīya* 1, 7, 7.

[4]R. V. x, 85,40-41; A. V. xiv. 2,3.4.

[5]Madhu corresponds to Chaitra; Mādhava to Vaiśākha; and so on.

[6]*Smrititatva*, Calcutta ed., 1895, p. 782.

[7]Here the rule is that the sacrifice should neither be performed in the 'dirty' month nor be given up, but should be performed in the subsquent month. The statement is that of washing off the sins in the dirty month.

[8]*Smrititattva*, p. 782.

[9]*Ibid*. p. 778.

CHAPTER TWO

The Calendar

Having thus proved the existence of a calendar during the Vedic times, I may now proceed to frame that calendar and its various forms out of the materials scattered here and there in the Sūtras and Brāhmanas. The general name by which the various forms of the Vedic calendar were known seems to have been Gavām-Ayana. It is only one of many forms of the Vedic calendar that I attempted to explain in my essay entitled '*Gavām Ayana*, the *Vedic Era*, published in 1908. Therein I have pointed out : (1) that the word *go* cow,' means the intercalary day, *i.e.* that day which is the product of the four quarter-days at the end of four successive solar years, each of 365¼ days; (2) that the term Gavām-Ayana or "Cows' Walk " means a series of such intercalary days, on each of which the Vedic poets regularly performed cyclic sacrifices; and (3) that in the Mahad-Uktha or Great Litany of Ṛigvédic hymns they kept a record of 460 or 465 intercalated days as having elapsed.

As the evidence I adduced in support of this theory is of an indirect and hypothetical nature, scholars have hesitated to accept it, and have opined that the passages which I explained in the light of this theory could bear other and perhaps more rational interpretations, and that my theory was rather an ingenious contrivance than a discovery of the real design of the Vedic poets. Probably no theory that is not based upon direct evidence is ever accepted; mine can be no exception, and would

share the fate of other theories if, like them, it had no direct evidence to support it. But the *Nidāna-Sūtra* of the *Sāma-véda* seems to supply the want. From this Sūtra we learn that Gavām-Ayana is a name given to the year which contained some intercalated days inserted either in its middle or at its close. It appears that the number of days intercalated differed with different schools of Vedic astronomers, and depended upon the difference between any two kinds of years selected for adjustment with each other. The school which had adopted the synodic lunar year of 354 days and the sidereal solar year of 366 days seems to have added to every lunar year a Dvādaśāha or period of twelve days, during which they performed a sacrifice with recitation of a Sāma-chant of twelve verses on the last day. With the school which had adopted the sidereal lunar year of 351 days, *i.e.*, the year of thirteen months of 27 days each, and adjusted it with the Sāvana year of 360 days, the number of days added was nine. Those who had adopted the Sāvana year of 360 days and adjusted it with the solar year of $365\frac{1}{4}$ days, seem to have been adding 21 days to every fourth Sāvana year. In this way there seems to have been during the Vedic period a variety of different astronomical schools, whose chief religious function was the performance of a grand sacrifice during each period of their respective intercalary days. A regular account of the 'cows' or intercalary days which each school counted and observed is found preserved under the general title of Gavām-Ayana, "the walk of cows or intercalary days". The term Gavām-Ayana seems to have been originally intended to be a name of only the intercalary days; but in the course of time it appears to have also been used to signify that year which contained intercalary days added to it, no matter whether the number of days so added, or counted as having been added, amounted to a year or more than a year. These and other important points connected with the Vedic calendar are clearly explained both in the *Nidāna-Sūtra* and in the *Śrauta-Sūtra* of Lātyāyana; and it is a matter for regret that, important as these works are for elucidating the much-vexed question of Vedic chronology, they have so long escaped the notice of oriental scholars. It is true that the Sūtras in general abound in elliptical and technical obscurities which sometimes render their

meaning uncertain and vague; still, so far as their main idea or purport is concerned, they leave us in no doubt whatever.

The passage of the *Nidāna-Sūtra* in which a few forms of Gavām-Ayana are defined, runs as follows, v. 11. 12:—

[1]अथातस्संवत्सरा वर्गाणां . पंचसंवत्सरा वर्गा:[2] तेषु धीरो मनीषया क्रमणं उपसदो विद्यात् संस्था वा एषु व्रतानि च. षट्त्रिंशोनो नवोनश्च षडहोनोऽथ सावनोऽष्टादशभिर्ज्यायानहोभि: सावनात्परो नाक्षत्रमिति मासश्च तस्य चैव त्रयोदश. चांद्रमसस्सावनश्चोभावथाष्टाश्युत्तमोऽष्टा सप्तत्रिंशते पौर्णमास्यां प्रसाधयेत् ।

गवामयनस्योपायांश्चतुर: प्रतिपादयेत्. तेषां नाक्षत्र: प्रथमस्तस्य सप्त विंशिनो मासा: सप्तविंशतिर्नक्षत्राणीति. तस्य कल्प: प्रथमस्य प्रथमस्याभिप्लवस्य स्थाने त्रिकद्रुकत्र्यहं कुर्यात्प्राग्विषुवत उत्तमस्योत्तमस्योर्ध्वं. विषुवत: ते खल्वभिप्लवतंत्र एव कॢप्ता: स्युरित्येके. एते चाधिकृता न चापि निवर्तयत्यथापि दृश्यते त्र्यहस्त्र्यहतंत्रे कॢप्तौ: यथा स्वरसामानस्त्रिकद्रुकपंचाहश्चाभिप्लवतंत्रे सप्तदशरात्रे । स्वरतंत्रा इत्यपरम्. एवं च तंत्राविलोप: अपि च सत्रेषु त्रिकद्रुकत्र्यह: स्वतंत्रो भवति.

अथ नवोनस्तस्यैवं त्रयोदश मासा: संभार्ययोर्मासयोर्नवाहं लुंपेच्चतुरहमेव प्राग्विषुवत: पंचाहमूर्ध्वं तस्य कल्प: प्रथमस्याभिप्लवस्य स्थाने ज्योतिषं. च गौं च कुर्यात्प्राग्विषुवत ऊर्ध्व विषुवत उत्तमस्याभिल्पवस्य स्थाने ज्योतिषवं नात्र विषुवानभिभवत्युत्तरेऽत्र पक्षसि विषुवानुपसंख्यायत इति.

अथ षडूनाश्चांद्रमसा: षट्पूर्णोपक्रमा: ऊनावसाना: पूर्वे पक्षसि मासास्स्यु: ऊनोपक्रमा: पूर्वावसाना उत्तरे. तस्य कल्प: प्रथमस्य प्रथमास्याभिल्पवस्य स्थानेऽभिल्पवपंचाहं कुर्यात्प्राग्विषुवत ऊनषु मासेषु स्उत्तमस्योत्तमस्योर्ध्वं विषुवत: ।

व्याख्यातस्सावन: । स एष आदित्यसंवत्सरो नाक्षत्र आदित्य: खलु शश्वदंतावद्भिरहोभिर्नक्षत्राणि समवैति त्रयोदशाहं त्रयोदशाहमेकैकं नक्षत्रमुपतिष्ठत्यहस्तृतीयं च नवधा कृतयोरहोरात्रयोर्द्वे कले चेति. सांवत्सरास्ताश्चतुष्पंचाशतं कला: ते षण्नववर्गा: स षट्पष्ठित्रिशत: षष्ठित्रिशते । श्लोकौ भवत—

सप्तविंशती राष्ट्रस्य राज्ञो वसतयो मिता: ।
त्रयोदशाहं त्रयोदशाहमेकैकं नक्षत्रमुपतिष्ठति ॥
त्रयोदशाहानि तृतीय मह्नश्चतस्त्रस्त्रेधा दशतयो विकुर्वन् ।
त्रिणवं पंथानं विततं पुराणं चत्वारिंशता नवरात्रैस्समश्नुते ॥ इति.

अथाष्टादशभिर्ज्यायानादित्यसंवत्सर एव तैर्यगयनिको भवति. आदित्य: खलु शश्वदेकदा षण्मासानुदङ्केति नव चाहानि तथा दक्षिणा. तदप्येते श्लोका भवंति—

यस्मिन्वै परिवत्सरे
सैम्यो मासोऽथं चांद्रमसो ।
नाक्षत्रो न विलुप्यते
कस्स्वित्तं वेद क स्स्वित् ।।
अष्टासप्तत्रिंशते तस्मिन्
संवत्सरे मिते ।
सौर्यो मासोऽथ चांद्रमसो
नाक्षत्रो न विलुप्यते ।।
सप्तविंशतिमेवैष सप्तां हानेति दक्षिणा ।
तथोदङ् समविंशतिमिति ।।

तस्य कल्प: संभार्ययोर्मासयोरष्टादशाहान्युपाहरेन्नवाहमेव प्राग्विषुवत: नवाहमूर्ध्वं त्रिकद्रु-काश्चाभिप्लव प्राग्विषुवतोऽभिपल्व च त्रिकद्रुकांश्चावृत्तानूर्ध्वं विषुवत:।

Then the years of the classes:[3] the classes (*are*) of five years. In them the sage by his wisdom will know the sessions of the ritual,[4] and the basic forms (*of the sacrificial rites*),[5] and the vows or ceremonies (*to be observed*) in them.

"(*The year*) which is less (*than the Sāvana year*) by 36 (*days*) that which is less by 9 (*days*); that which is less by 6 (*days*); then the Sāvana year (*of 360 days*); then the year which is greater than the Sāvana year by 18 days. The sidereal year (*of 351 days*) has a thirteenth month (*of 27 days*). Then the two kinds of years: the lunar and the Sāvana. Then the year which is greater than the Sāvana year by 18 days: one has to observe (*it*) on every 38th or 37th full-moon.

"He has to know the four forms of Gavām-Ayana. Of them, the sidereal year (*of 324 days*) is the first; its months are of 27 days each, becaus there are 27 *nakshatras*. The mode of observing it (*is this*): in the place of each first [period of six days called] *Abhiplava* (*of every month of 30 days*) before the central day (*of the year*), one should observe [a period of only three days known as] *Trikadruka*: (*likewise in the place*) of each last[6] (*Abhiplava*) after the central day. Some say that they (*the Trikadruka days*) are so devised as to be of the same form as the *Abhiplava* days; they have their place here; nor is their

observance opposed to that of the *Abhiplava* days. It is also known that, like the *Svarasāman* days,[7] the unit of three days [the *Trikadruka* days] is devised as a special period of three days The three *Trikadruka* days, as well as the five days of the six *Abhiplava* days are observed together in the sacrificial session of seventeen nights.[8] Others say that the *Trikadruka* days are the same as the *Svarasāman* days. And thus the usual form of the calendar days and their rites is not lost; for the *Trikadruka* days have their own independent place in all sacrificial sessions.

"Then (*the year of 351 days*) which is less (*than the Sāvana year*) by nine days; thus it has thirteen months (*each of 27 days*). He has to omit nine days in the two intercalary months [*saṁbhārya*;[9] *i.e.*, the sixth and the seventh month, each of 30 days]; four days (*are to be omitted*) before the central day of the year, and five days after it. This is how it is done: in the place of the first *Abhiplava* (*of the sixth month of 30 days*) before the central day, only two days known as *jyotis* and *go*, are to be observed; and in the place of the last *Abhiplava* (*of the seventh month*) after the central day, only one day, known as *Jyotis*, is to be observed. No central day occurs in the year (*of 351 days*) for it is counted in its latter half.

"Then the lunar years (*of 354 days*) which are less (*than the Sāvana year*) by six days:[10] in the first half (*of this year*) there are six months, beginning with one which is full [*i.e.*, consists of 30 days] and ending with one which is deficient [*i. e.*, contains only 29 days]; in the latter) *half there are six months*), beginning with one which is deficient and ending with one which is full. This is how it is observed : in the deficient months before the central day, in the place of each first *Abhiplava* one should observe (*only*) five days of *Abhiplava*; (*likewise in the place*) of each last (*Abhiplava*) in the deficient months after the central day.

"The Savana year (*of 360 days*)[11] has been explained. It is this same sidereal year of the sun.[12] The sun is known to pass through (*each of*) the *nakshatras* in a fixed number of days: he remains in each *nakshatra* for thirteen and thirteen days,

together with a third part of a day and two out of nine *kalās* or parts of a day and night [*i.e.*, of a whole day]: these *kalās* or parts amount in a year to 54, and are equal to six times nine *kalās* [*i. e.*, 6 days] : thus it consists of 366 (*days*) as contrasted with the (*Sāvana year*) consisting of 360 (*days*). There are two verses about this :—

"Twenty-seven are the mansions in the king's [*i. e.*, the Sun's] dominion; thirteen and thirteen days he resides in each *nakshatra*: thirteen days and one-third of a day; thus dividing four times ten days into three (*equal*) parts, he traverses the broad and ancient path of thrice nine stations in the course of forty periods, each of nine nights.'

"Then the year of the sun (*of 378 days*)[13] which is greater (*than the Sāvana year*) by eighteen days; this indeed is made by his transverse motion;[14] it is well known that the sun always goes to the North for six months and nine days, and likewise to the South. Accordingly there are the following verses :—

"Who knows that year in which the solar, the lunar, and the sidereal months are not lost, who knows that ? In the year measured by 37 or 38 (*full-moons*), the solar, the lunar, and the sidereal months are not lost. The sun goes to the South for twenty-seven times seven days, and likewise to the North for twenty-seven times seven days.

"This is how this year is observed:—In the two intercalary months,[15] one should intercalate eighteen days; nine days before the central day of the year and nine days after it; three *Trikadruka* days and six *Abhiplava* days before the central day, and six *Abhiplava* days and three *Trikadruka* days after the central day.'

Similar forms of calendar, together with some more varieties are also described in the *Śrauta-Sūtra* of Lātyāyana, iv. 8, 1—7. This is what be says :—

ज्योतिषामयन विकल्पा: । तव यदादितोऽन्ततस्तदूर्ध्वं विषुवत :। मासि मास्याद्य स्याभिप्लवस्य स्थाने त्रिकद्रुका: । स षट्त्रिंशद्नी नाक्षत्रस्समविशिनो हि मासा: । षष्ठापस्याभिप्लवस्य

स्थाने ज्योतिगौश्च ज्योतिरेवावृत्ते स नवोनो नाक्षत्र एव त्रयोदशी । युग्मासेष्वाद्यस्याभिप्लवस्य स्थाने तत्पंचाहः स षड्नश्चान्द्रमसः । षष्ठादौ त्रिकद्रुकानभिप्लवं चोपदध्यात सोऽष्टादशाधिकः पौर्णमासीप्रसवस्तैर्यंगयानिक आदित्यस्य ।

"Varieties of the movements of the heavenly luminaries. In the calendar pertaining to these movements, that which is observed at the beginning (*of each month*) before the central day, is observed at the close (*of each month*) after the central day. In the place of the first six *Abhiplava* days in each month, only three *Trikadruka* days are observed. Thus this sidereal lunar year is less (*than the Sāvana year*) by 36 days, since its months consist of 27 days each.

"In the place of the first six *Abhiplava* days of the sixth month (*of the Sāvana year*), there are observed only two days, known as *Jyotis* and *go*; and in the second part of the year, which is merely a repetition of the first part, only one day, known as *Jyotis*, is observed in the place of the ast six *Abhiplava* days (*of the seventh month*); thus it is less (*than the Sāvana year*) by nine days, and is a sidereal year having a thirteenth month.[16]

"In the place of the first six *Abhidlava* days in all the even months, only five *Abhiplava* days are observed; this is less (*than the Sāvana year*) by six days, and is lunar.[17]

"In the beginning of the sixth, month one should intercalate three *Trikadruka* days and six *Abhiplava* days;[18] thus it is greater (*than the Sāvana year*) by 18 days, and is productive of a full moon; and it is caused by the transverse motion of the sun."[19]

Besides the three forms of calendar mentioned above, which are similar to those described in, the *Nidāna-sūtra*, a few more varieties also are noticed in the Latyayana *Srauta sūtra*. As some of these varieties are referred to, though only briefly, in the *Krishṇa-Yajurveda*, it need not be said that they existed during the Vedic period, and that they are not the later ontrivances of Sūtra wtiters. It is therefore necessary that we should understand them as clerly as possible. The Lāt yāyana Sūtra continues in iv. 8. 8-20:—

उत्सर्जनानि मासि मासि । यथाऽन्त एवमावृत्तानानामदिः । पूर्वेष्वभिप्लवेषु षष्ठमहरुक्थ्यं कृत्वाऽग्निष्टोममुत्तमे । तद्वैकत्रिकस्तोमम् । सवनविधं पशुं कुर्वन्नुत्तममभिप्लवपंचाहं कृत्वा षष्ठस्थाने सवनविधः । पशुः । प्रथमं वाभिप्लवं पंचाहं कृत्वा मासांते सवनविधः पशुः । सर्वान्नूनानेके प्रथममभिप्लवपंचाहं कुर्युः । अहनी वा समस्येयुरभिप्लवपृष्ठ्ययोः सन्निपातके । अभिप्लवयोरुत्तमे । तथा सत्येकादश्यां पूर्वपक्षस्य दीक्षित्वा त्रयोदशदीक्षा : कुर्वीरन् । सप्तदश वा । व्यत्यासं वा पूर्णानानपूर्णानावृत्तान् शालंकायनिनः ।

"Omissions (*of days*) month after month. Just as the last[20] day (*in each month in the first half of the year*) is omitted, so the first day (*in each month*) in the repeated part of the year [*i. e.* the second part] is omitted. Having treated as *Ukthya* days the sixth day in each of the three *Abhiplava* periods of six days, they observe the sixth day of the last *Abhiplava*, [*i. e.*, the fourth *Abhiplava*] as an Agnishṭoma day.[21]

"On the sixth day of the fouth *Avhiplava* period of each month, they have to recite a set of Sāma-verses called *Ekatrika*[22] In view of immolating a sacrificial animal, they make the last (*i. e. the fourth*) *Abhiplava* consist of only five days, and immolate a sacrificial animal on the sixth day. Having made the first *Abhiplava* consits of only five days, they immolate a sacrificial animal at the close of the month. Some teachers make all the months deficient by one day : they make the first *Abhiplava* of each month consist of only five days.[23] At the junction of *Abhiplava* and *Prishtya* days,[24] they reckon the last day of the *fourth*) *Abhiplava* period and the first day of the *Prishthya* as one day [*i. e.*, they treat the two as a single day]. In the last month [*i. e.*, the twelfth month], they make the last day of the last but one *Abhiplava* the first day of the last *Abhiplava*.[25] If so [*i e.*, if they omit one day in each month of the year], they should undergo the vow of initiation for their sacrifice on the eleventh day of the bright half of the month, and spend thirteen days in vow (before they perform their sacrifice on the fourteenth, *i.e.*, the *Ekāshtakā* day of the dark half of the month). Or they have to spend seventeen days in vow.[26]

Calendar—Form I

[Abbreviations: J=*jyotis*; G=*go*; Ā=*āyus*.]

Savana Year of 360 Days

1st Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

2nd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

3rd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

4th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

5th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

6th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3*	4*	5*	6*
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30*

7th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25*	26*	27*	28*	29*	30*

*In order to convert this year into the sidereal lunar of 351 days the days marked with an asterisk in the 6th and 7th months are omitted; see also Calendar, Form II.

**This is the Vishuvat or central day of the year.

N.B.—Instead of being called *Abhiplava*, the last week in each month seems to have been called by others, as *Prishtya*, the days being named Rathantara, Bṛihat, Vairūpa, Vairāja, Sākvara, and Raivata respectively.

8th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

9th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

10th Month		J	G	Ā	G	A	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

11th Month		J	G	A	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

12th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

Calendar– Form II

Sidereal Lunar Year of 351 days

1st Month		J	G	Ā	G	Ā	J
Abhiplava	I	1		3			
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

2nd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

3rd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

4th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

5th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	..	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

6th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	..	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

7th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

8th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

9th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

10th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

11th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	....	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

12th Month		J	G	Ā	G	Ā	J.
Abhiplava	I	1	2	3	...	...	...
	II	4	5	6	7	8	9
	III	10	11	12	13	14	15
	IV	16	17	18	19	20	21
	V	22	23	24	25	26	27

Calendar Form III

Synodic Lunar Year of 354 days

1st Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

2nd Month		J	G	Ā	G	Ā	J
Abhiplava	I	...	1	2	3	4	5
	II	6	7	8	9	10	11
	III	12	13	14	15	16	17
	IV	18	19	20	21	22	23
	V	24	25	26	27	28	29

3rd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

4th Month		J	G	Ā	G	Ā	J
Abhiplava	I	...	1	2	3	4	5
	II	6	7	8	9	10	11
	III	12	13	14	15	16	17
	IV	18	19	20	21	22	23
	V	24	25	26	27	28	29

5th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

6th Month		J	G	Ā	G	Ā	J
Abhiplava	I	...	1	2	3	4	5
	II	6	7	8	9	10	11
	III	12	13	14	15	16	17
	IV	18	19	20	21	22	23
	V	24	25	26	27	28	29

7th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

8th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	...

9th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

10th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	...

11th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

12th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	...

N. B.—Instead of being called *Abhiplava*, the last period of six days in each month seems to have been observed by others as *Prishthya* days.

N. B.—Apparently the months 7 to 12 should run 29, 30, 29, 30 29, 30 (not 30, 29, 30, 29, 30, 29) – J. F. Fleet.

Calendar—Form IV

Sidereal Solar Year of 366 days with an Intercalation of 18 days

1st Month		J	G	Ā	G	A	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

2nd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

3rd Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

4th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

5th Month		J	G	Ā	G	A	J
Abhiplava	II		2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

6th Month		J	G	Ā	G	Ā	J	J	G	Ā
Abhiplava	I	1	2	3	4	5	6	7	8	9
	II	10	11	12	13	14	15	...	...	..
	III	16	17	18	19	20	21	...	...	...
	IV	22	23	24	25	26	27	..	...	...
	V	28	29	30	31	32	33	...	...	...
	VI	34	35	36	37	38	39*	40	41	42
	VII	43	44	45	46	47	48	...	...	...

7th Month		J	G	Ā	G	A	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

8th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

9th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

10th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7.	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

11th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

12th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
	V	25	26	27	28	29	30

(i) The asterisk in the sixth month marks the Vishuvat or central day of the year.

(ii) Here, also, *Prishthya* days may have been substituted for *Abhiplava* days at the close of each month.

Calendar—Form V

		1	2	3	4	5	6
Abhiplava	I	J	G*	Ā	G	Ā	U
	II	J	G	Ā	G	Ā	U
	III	J	G	Ā	G	Ā	U
	IV	J	G	Ā	G	Ā	Agni
Pṛishthya	I	R	B	V	Vr	S	Rai

Note—Similarly the other months, only *Pṛishthya*, taking the place of the first Abhiplava in the second half of the year.

Calendar—Form VI

		1	2	3	4	5	6
Abhiplava	I	J	G	Ā	G	Ā	J
	II	J	G	Ā	G	Ā	J
	III	J	G	Ā	G	Ā	J
	IV	J	G	Ā	G	Ā	Ekatriká
Pṛishthya	I	R	B	V	Vr	S	Rai

* This day is not counted; similarly the other months.

Calender—Form VII

		1	2	3	4	5	6
Abhiplava	I	O	G	Ā	G	Ā	J
	II	J	G	Ā	G	Ā	J
	III	J	G	Ā	G	Ā	J
	IV	J	G	Ā	G	Ā	J
Pṛishthya	I	R	B	V	Vr	S	Rai

Calendar—Form VIII

Month 11		1	2	3	4	5	6
Abhiplava	I	J	G	Ā	G	Ā	J
	II	J	G	Ā	G	Ā	J
	III	J	G	Ā	G	Ā	J
	IV	J	G	Ā	G	Ā	J
Prishthya	I	R	B	V	Vr	S	Rai

Calendar—Form VIII

Month 12		1	2	3	4	5	6
Abhiplava	I	J	G	Ā	G	Ā	J
	II	J	G	A	G	A	J
	III	J	G	A	G	A	...
		R	B	V	Vr	S	Rai
The Dvādaśāha		C^1	C^2	C^3	C^4	M	U

C^1 to C^4=Four Chandoma days; M=Mahāvrata; U=Udayanyīa day

Calendar—Form IX

The sāvana year with twenty-one intercalary days inserted between the sixth and seventh months

6th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
Prishṭhya days		25	26	27	28	29	30

Abhijit	Six Pristhya days	Three Svarasāma day	Central day	Viśvajit	Three Svarasāma days	Six Pristhya days
1	1 2 3 4 5 6 7	8 9 10	11	12	13 14 15	16 17 18 19 20 21

7th Month		J	G	Ā	G	Ā	J
Abhiplava	I	1	2	3	4	5	6
	II	7	8	9	10	11	12
	III	13	14	15	16	17	18
	IV	19	20	21	22	23	24
Prishthya days		25	26	27	28	29	30

Names for the different kinds of years as suggested by Dr. J. F. Fleet :—

$324=27\times12$	"Sidereal lunar year of 324 days."
$351=27\times13$	"Sidereal lunar year of 351 days."
$354=30\times6+29\times6$	"Synodic lunar year."
$360=30\times12$ or $27\times13\frac{1}{3}$	The best possible term for this is the original one. "Sávana year."
$366=27\times13\ ^{5}/_{9}$	"Sidereal solar year"
$378=189+189$	"pseudo-solstitial year of 378 days,"
365	"Vague solar year."
$365\frac{1}{4}$	"Julian solar year." -This term involves an anachronism but it is customary and explains at once what is meant.

"The school of Sālaṅkayanins observe full and deficient months alternately in the first half of the year, and deficient and full months alternately in the second half of the year."

These are some of the forms of the calendar kept by the Vedic poets. Of these : (1) the sidereal lunar year of 351 days, with 9 or 15 days intercalated according as it was to be adjusted to the sāvana year of 360 days or to the sidereal solar year of 366 days, (2) the synodic lunar year of 354 days, with 12 days intercalated to adjust it to the sidereal solar year, and (3) the cycle of three sāvana years each of 360 days, with 18 days intercalated in every third or fourth sāvana year for the purpose of adjusting it to the sidereal solar year of 366 days, are the prin-

cipal forms which deserve our attention. The rest of the forms noticed in the Srauta-Sūtra of Lātyāyana differ from each other in the rituals assigned to the days of the month.

The most important of these three principal forms is the synodic lunar year of 354 days, with the 12 intercalated days, or the Dvādaśāha period as it is usually styled in the Vedic literature. Regarding this addition of 12 days to the lunar year the Nidāna-Sūtra VI 6, says:—

सर्ववेदसमिति ते खल्वेते धर्मा एतस्मिन्नेव द्वादशाहे स्युरिति. गौतमोऽत्र हि संवत्सराप्ति वदतीति. ऊर्ध्वं द्वादशाहात् सांवत्सरिकाणीति धानंजप्य:

"As regards the gift of the entire property of the sacrificer:- These functions (*i. e.*, the gifts of the entire property) are the marked features of the period of twelve days; for Gautama says that it is here (*in the period of 12 days*) that the year is attained. And Dhānaṁjapya says that after the lapse of the twelve days the functions of the (*new*) year are begun."

This intercalary period of 12 days seems to have been inserted by some in the middle of the year and by others at its close. From the famous Atharvavēda, verse IV 15. 3 (see p. 3 above), it is clear that the period of 12 days, or the vow of 12 nights as it is styled therein, was added at the close of the year As regards its insertion in the middle of the year, the Srauta-Sūtra of Lātyāyana IV, 5. 3-5, furnishes clear proof : the passage runs as follows :—

अतिरात्रचतुर्विंश नवाहव्रतातिरात्रा वा यथास्थान स्यु: शेषो ज्योतिष्टोमेन । अत्र वा गोआयुषी पृष्ठ्याभिप्लवा: दशरात्रमित्यु पाहरेत. स संवत्सरप्रवर्ह: । शखाहतं च ।

"An *Atirātra* day on which twenty-four Sāma verses are recited, then the period of nine days then the day of Mahavrata, and then the final *Atirātra* day, are severally observed in their respective places (*in the year*); the rest of the days of the year are observed in the Jyōtishṭōma way. Or one may insert the twelve days by treating two days as the days termed *gō* and *āyus*, and by observing the period of ten days as made up of six *Prishṭhya* days and four of the six *Abhiplava* days.[27] This period of twelve days is what is generated by the year. Its birth is proclaimed by blowing a conch-shell."

What is meant by the above passage is this :—The first day of the twelve days is observed as an *Atirātra* day, with the recitation of twenty-four Sāma verses, in the beginning of the year; the period of nine days is inserted in the middle of the year; the remaining two days are observed as the day of the Mahāvrata or great vow and as a final *Atirātra* day at the close of the year. This is what is mean by observance of the twelve days in their respective places. Others seem to have been observing the same period by treating two days as *gō* and *āyus* six days as *Prishīhya* days, and the remaining four days as the first four days of the six *Abhiplava* days. The blowing of a conch-shell seems to have been to inform the people of the arrival of the twelve days of vow, when it was obligatory for each sacrificer, and perhaps for the people also, to observe the rites of *Dīkshā* or initiation, in order to get rid of the sins of the year.

It is true that it is not clearly stated in the above passage that the period of nine days was inserted in the middle of the year; still, from the names given to the nine days and from the commentary of Agnisvāmin on Lāṭyāyana-Srauta-Sūtra IV 6 12, we can clearly understand that nine out of the twelve days were inserted at the middle of the year; the commentary says:—

अभिजित त्रयस्स्वरस्सामानः विषुवान् आवृत्तास्त्रयस्स्वरसामानः विश्वजित इत्येष नवाहः

"The day called *Abhijit*, three *Svarasāman* days, the central day, the three *Svarasāman* days again repeated in the reverse order, and a *Visvajit* day, constitute the period of nine days."

It should be noticed here how the central day of the year is plainly stated to form part of the nine days. It follows, therefore, that the period of nine days was inserted in the middle of the year. It must also be borne in mind that whenever a day or days is or are called *Abhijit*, *Viśvajit* or *Svarasāman*, it or they must be regarded as falling in the middle of the year.

Again, the other sūtra, in the commentary on which Agnisvāmin distinctly says that the period of nine days was inserted in

the middle of the year, is one which deserves our particular attention. It is also desirable that we should consider the chapter in which this sūtra occurs together with the chapter which precedes it. In these two chapters (IV, 5, 5-6) Lātyāyana describes the various forms of the rites and recitations assigned to the days of Gavām-Ayana. While describing the form of the rites to be performed on the *Svarasāman* days which form part of the period of nine days, he refers to a school of sacrificers who are said to have been observing twenty-one days instead of nine days in the middle of the year. This sūtra IV 6. 12, with Agnisvamin's commentary on it, runs as follows:—

एकविंशत्यहृकारिण उपरिष्टादभिजित: पृष्ठयमुपयंति प्राक्च विश्वजित: स्वरसाम्नश्चोक्-थयान.

योऽयं संवत्सरस्य मध्ये न वाह: पठित: अभिजित् त्रयस्स्वरसामानो दिवाकीर्त्यमह: त्रयस्स्वरसामानो विश्वजिदिति एतस्य स्थाने अपरे एकविंशत्यहं कुर्वंति उपरिष्टादभिजित: प्राक् स्वरसानम्य: पृष्ठयमुपयंति. प्राक् विश्वजित: स्वर साम्न: कृत्वा पृष्टयमुपयंति स्वरसाम्न-श्चोकथयान कुर्वंति विचारितमिदं ब्राह्मणेन—तानाहुरुकथया: कार्याऽग्निष्टोमा इत्येवमुत्क्वाह तदाहुर्वीवधमिव वा एतद्यदग्निष्टोमो विषुवान् अग्निष्ठोमौ विश्वजिदभिजितौ अथेतर उक्थया स्स्युरिति-अग्निष्टोमा एव सर्वे कार्या इति. यदग्निष्टोमं तदेवशब्देन नियमितं. एव नियमिते सति किमुकथयत्वं स्वरसाम्नां प्रत्याम्नातमेव अथ विकल्प: इति उच्यते न प्रात्याम्नायते न च विकल्प्यते ? ये एकविंशत्यहकारिणी: ते उकथ्यान् कुवति ये नवाहकारिण: ते अग्निष्टोमाजेव, एवं च कृत्वा निदानकारोऽप्याह—अथैते स्वरसामान: तानग्निष्टोमान्नवाहकारिण: कुर्यु: उक्थ्यानेकविंशत्यहकारिण: योऽन्यथा कुर्यादकुशल: पुरुष इति विद्यादिति

"Instead of the period of nine days, which is spoken of as a period inserted in the middle of the year and which is composed of one day called *Abhijit*, three *Svarasāman* days, one day termed *Divākirtya* [*i. e.*, the central day], again three *Svarasāman* days and one *Viśvajit* day, other insert twenty-one days:.after the *Abhijil* day and before the three *Svarasāman* days, they insert six days known as *Prishthya* days; again after having observed the three *Svarasāman* days (*after the central day*) they insert six *Prishthya* days before the *Viśvajit* day. Also they treat the *Svarasāman* days in the Ukthya way. This matter is found discussed in the *Brahmana*: -They debate as to whether the *Svarasāman* days are to be treated in the Ukthya way or in the Agnishtōma[28] way. After saying that, the *Brāhmana* goes on

to state:—They say that the fulcrum-like support of the year is the central day which is treated in the Agnishṭōma way, and the two days called *Abhijit* and *Viśvajit* which are also treated in the Agnishṭoma way. The other days are observed in the Ukthya way. Others say that *all* the days should be treated *only* in the Agnishṭōma way—By the word 'only used in the statement, it is the Agnishṭōma way that is ruled in preference to the Ukthya way. The ruled being thus state, there still arises the doubt as to whether the *Svarasāman* days are to be observed only in the Agnishṭōma way or in either of the two ways, the Agnishtoma and the Ukthya ways. It is not, however, a rule that the *Svarasāman* days are to be observed only in the Agnishṭōma way; nor is it an alternative that they may be observed either in the Agnishṭòma way or in the Ukthya way. But it is a matter differing according to different schools: those who intercalate twenty-one days observe them in the Ukthya way, while those who insert nine days treat them only in the Agnishṭōma way. The author of the Nidāna-Sūtra also says (V. 7):— "Then the *Svarasāman* days those who insert nine days treat them in the Agnishṭōma way, while those who intercalate twenty one days observe them in the Ukthya way.[29] Whoever treats them otherwise is to be regarded as a man devoid of knowledge'

The essential points that we have to consider, setting aside the other details discussed in the above passage, are the intercalation of nine days and that of twenty-one days in the middle of the year. The period of nine days has already been shown to be a period which forms part of twelve days inserted either in the middle of the year or at its close. But we are not expressly told of the particular form of the year which with the addition of 12 or 21 days would, as stated by Dhanamjapya (see under Nidāna-Sūtra VI. 6), results in a Saṁvatsara or true or almost true year. Still from the consideration of the data contained in the sūtras themselves, it is easy to determine them. We know that the purpose of intercalation is to adjust any two kinds of years so that the seasonal and other characteristics are as well defined in the one as in the other. We also know that, of the various kinds of years, those which were the first to be recognised were such as consist of twelve or thirteen months,

each of which is well marked by the recurrence of certain celestial phenomena. The sidereal lunar month of 27 days, for example, seems to have been adopted because it is marked (though) not quite exactly) by the moon's completion of a round through the heavens. Likewise, the synodic lunar month of 29½ days is marked by the occurrence of full or new moon. It is the consideration of the recurrence of seasonal characteristics that led the ancients to assign to the year twelve or thirteen months, during which they expected, in virtue of long experience, a complete round of all the seasons. But it is well known that neither the sidereal lunar year of 351 days, nor the synodic lunar year of 354 days, nor even the sāvana year of 360 days, is in exact agreement with the round of the seasons. Hence it is that the ancients seem to have been led to discover the sidereal and the solar years, in the course of which the seasons fairly will complete a round, and that they began to adjust the years of their first selection with the sidereal solar year. Now, we may cofine ourselves to four of the five and know that there are four kinds of years mentioned in the Nidāna-Sūtra:[30] the sidereal lunar year of 351 days; the synodic lunar year of 354 days; the sāvana year of 360 days; and the sidereal solar year of 366 days. Of these, it cannot be the year of 351 days to which the Vedic poets added 12 intercalary days; for, with the addition of 12 days, it amounts to only 363 days, which is less than a true year, while with the addition of 21 days it gives 372 days which is more than a true year. It is true that the so-called Gavām-Ayana year described in all the Srauta-Sūtras consists of 360 or 361 days, in the middle of which were put nine days bearing the same names with the nine days which formed part of the Dvādaśāha or period of twelve days. Hence we might be led to think that year in which twelve days were intercalated might be a vague year of 348 days, which, with the addition of 12 days. would make a year of 360 days termed Gavām-Ayana. But no year of 348 days is mentioned in any of the Srauta-Sūtras. And as regards the school of Vedic poets who, according to Lātyayāna II, 8,1 5, adopted a month of 29 days and a year of 348 days, we are told by Lātyayāna himself that they were observing 17

Dikshā-days or days of initiation, before they commenced their sacrifice on the New Year's Day. Also, the so-called Gavām-Ayana year is not, as I have pointed out in chapter III of my *Vedic Era*, a true year, but an imaginary year, made up of all those twenty-first days in a cycle of four sāvana years which had been so far counted as often as they occurred. Hence it cannot be the sāvana year in the middle of which nine of twelve days were inserted. It follows, therefore, that it is the synodic lunar year of 354 days to which the addition of 12 days must have been made, in order to adjust it with the sidereal solar year of 366 days. As regards the year to which the addition of 21 days was made, it appears to be a cycle of three sāvana years each of 360 days, followed by a year of 360+21=381 days, with the result that four sāvana years, each of 360 days, with the addition of 21 days, were rendered equal to four Julian solar years each of 365¼ days. That the Vedic poets had been observing such a cycle of years with 21 intercalary days is almost expressly stated in the following passage of the Nidāna-Sūtra, X, 1 :—

पूर्वस्मिन्नेक विंशतिरात्रे सत्रमासते उत्तरं तत्रैते सामस्य निदधति एकविंशतिरात्रं च द्वादशाहं चैते नानात्व ल्कप्ते इति पंचाहल्कृप्तमुत्तमं प्रथमे विषमयुक्ता: पंचाहा: हंत पंचाहानेव करवाणी एवं पक्षसास्समाधिरिति ।

"On the day immediately before the twenty-first day, they sit at their sacrificial session. On the following day they put the last day (*i. e.*, the 21st day) in its entirety. The period of 21 days and that of 12 days are varieties (*of adjusting the years*) The last [*i. e.*, the 21st day] is based upon the period of five days; the original periods of five days are accompanied by an odd portion (*of a day*). Lo! I shall observe only five days; by my doing so the parts of the year are undisturbed."

In another place the Nidāna-Sutra, VIII, 11, says that the odd portion of a day accompanying the five days is neither more nor less than a quarter of a day. The passage in which this idea is implied runs as follows :—

अतुषड्हे कथं रात्रिरिति भकर्तव्येति शौचिवृक्षि: एवमुत्पन्नो हि भवति अथाप्यनाविष्टा व्यूहेन भवति भथापि कथमहीनाह्नो रात्रेऽपायोऽभविष्यदिति भथापि कृत्स्नतायै वै नूनमिह रात्रि; क्रियेत कृत्स्नोऽयं षडह इति भथाप्येष चतुर्थो भागो रात्रे : भस्यांह्निताभस्य-

क्रमिष्यदिति कर्तव्येति गौतम: आदिष्टा कल्पेन भवति अथाऽग्रेपा अहीनसस्था यद्रात्रि: तामवसानभूतां षष्ठमहरागच्छति ।

"How is the night observed as part of the sacrifice performed during the Seasonal Six days? Sauchivrikshi says that it need not be observed, for the reason that its origin is such. Also, it is inferred rather than prescribed in the Kalpa texts. How then are the *Ahīna* days[31] to commingle with the night ? Verily it is merely on account of its completion that the night has to be observed here, for the period of six days has become complete. Also it is the one-fourth part of the night that has grown (*into a whole day*). Gautama says that it is to be observed and that it is prescribed in the Kalpa texts. The night forms part of the sacrificial days which constitute the Ahīna period; the sixth day arrives at the close of the night."

From these passages it is clear that the Vedic poets were quite aware the fact of a solar year being greater than the sāvana year by five days and a quarter. This they seem to have found out by closely observing the fluctuations in the seasons, which they must have necessarily experienced so long as they had used a year of only 354 or 360 days. It is this inevitable change of the seasons in the lunar and the sāvana years that is implied in the term *Ṛtu-shadaha*, meaning the six days capable of keeping the seasons in their proper places in the year. It should also be noted how the sixth day of the Seasonal Six days is termed an abnormal growth of a quarter of a day in the above passage. There is also a passage in the *Krishna-Yajurveda* in which it is clearly stated that the five days after the close of the sāvana year are such as have the power of creating the seasons. The passage, VII. 1. 10, runs as follows:—

संवत्सरो वा इदमेक आसीत्. सोऽकामयतर्तून्सृजेयेति. स एतं पंचरात्रमपश्यत् तमाहरत् तेनायजत ततो वै स ऋतूनसृजत य एवं विद्वान्पंचरात्रेण यजते प्रैव जायते त ऋतवस्सृष्टा न व्यावर्तते त एतं पंचरात्रमपश्यन तमाहरन् तेनायजत ततो वै ते व्यावर्तंत य एवं विद्वान्पंच-रात्रेण यजते वि पाप्मना भ्रातृव्येणावर्तते सार्वसेनिश्शौचेयोऽकामयत पशुमान् स्यामिति स एतं पंचरात्र माहरत्तेनायजत ततो वै स सहस्रं पशून्प्राप्नोत य एवं विद्वान्पंचरात्रेण यजते प्र सहस्रं पशूनाप्नोति बबर: प्रावाहुणिरकामयत वाच : प्रवदिता स्यामिति स एतं पंचरात्रमा-हरत्तेनायजत ततो वै स वाच: प्रवदिताऽभवत् य एवं विद्वान्पंचरात्रेण यजते प्रवदितैव वाचो

भवति भथो एनं वाचस्पतिरित्याहुः भनातश्चतूरात्रोऽतिरिक्तष्षडात्रः भथवा स्थ संप्रति यज्ञो यत्पंचरात्रः य एवं विद्वान्पंचरात्रेण यजते संप्रत्येव यज्ञेन यजते पंचरात्रो भवति पंच वा ऋतवस्संवत्सरः ऋतुष्वेव संवत्सरे प्रतितिष्ठति

"The year (*of 360 days*) was of yore undifferentiated; it desired that it might create the seasons; it saw the five nights, caught hold, of them and sacrificed by them; then it created the seasons: whoever with this knowledge sacrifices by the five nights becomes endowed with children. The seasons, once created, did not regularly return again; they saw the five nights, caught hold of them, and sacrificed by them; then they regularly returned: whoever with this knowledge sacrifices by the five nights gets rid of his sin, his powerful enemy [*i. e*, the intercalary days burdened with sin]. Sauchéya, the son of Sarvasēna, desired that he might be possessed of cattle; he caught hold of the five nights and sacrificed by them, then he obtained a thousand head of cattle: whoever with this knowledge sacrifices by the five nights obtains a thousand head of cattle. Babara, the son of Prāvāhaṇi, desired that he might be possessed of eloquence; he caught hold of the five nights and sacrificed by them; then he became an orator: whoever with this knowledge sacrifices by the five nights undoubtedly becomes an orator; him they call the lord of speech. *Four nights are less; six nights are more*; the sacrificial period of *five nights is neither less nor more*: whoever with this knowledge sacrifices by the five nights acquires the merits of a sacrifice performed neither in less nor in geater time. Five are the nights and five are the seasons which compose a year: (*whoever observes them*) gets a firm footing in the seasons of the year."

If we read the above three passages along with Agnisvāmin's commentary on Lātyāyana's aphorism, IV 6. 12, and the two verses of the Sāmavēda, II. 1. 17. 3, and VI. 2.2.7, together with the verses of the Atharvavēda, IV. 15. 13, and IV. 16. 6, all of which are quoted above, we can clearly understand that, when the Vedic poets recognised the failure of the synodic lunar and the sāvana years to keep pace with the course of the seasons, some of them seem to have discovered the sidereal solar year of 366days, and regarded it as capable of agreeing with a round of

the seasons. Others, with more accurate observation, seem to have been divided in their opinion, and to have taken a vague solar year of 365 days according to some, and a more true solar year of 365 $^1/_4$ days according to others, as the one fairly agreeing with the course of the seasons. Those who observed the synodic lunar year of 354 days seem to have been passing 12 days in *Dikshā* or vow of initiation after its close and before the commencement of the sidereal solar year. Of those who followed the sāvana year of 360 days, some seem to have been adjusting it with a solar year of 365 days by adding five days to it, as exclāimed by the speaker in the Nidāna-Sūtra: "Lo ! I observe only five days, thereby making the two wings of the year undisturbed." But those who were still more accurate in their observation appear to have framed a cycle of four sāvana-and solar years, and to have adjusted the sāvana year with a solar year of 365¼ days by adding 5¼ × 4 = 21 days to every fourth sāvana year. As we have already seen, this period of 21 days has been called by various names: some called these days the thrice seven milch-king pouring their genuine milky draught for the nourishment of Sōma, the moon; others seem to have regarded them as the 21 fetters of Varuṇa, to be got rid of by the observance of the rites of *Dīkshā* and *Upasad*. There is no reason to doubt that it is these twenty-one days which, as stated by Agnisvāmin, were inserted in the middle of the year as an alternative for the twelve days inserted by others. We may therefore take it for garnted that the statement of the *Tāṇḍya-mahāhbrāhmaṇa*, XXV. 18. 1, that "five times fifty periods of 21 days make one thousand years of the Viśvasṛiks," is one which was based upon an actual practice, and was not a mere theoretical problem as has been held by one critic of my views.[32]

Besides the period of 1000 years, the *Tāṇḍyamahāhbrāhmaṇa* mentions three minor periods, naming the priestly astronomers who observed them. Prājapati seems to have been the first to observe for verification three cyclic years with twenty-one intercalary days in the course of twelve solar years. The passage in which this is mentioned, xxv. 6. 1. 2, runs as follows :—

त्रयस्त्रिवृतस्संवत्सरास्त्रय: पंचदशा: त्रयस्सप्तदशास्त्रय एकविंशा: प्रजापतेर्द्वादशसंवत्सरम
एतेन वै प्रजापतिस्सर्वस्य प्रसवमगच्छत्सर्वस्य प्रसवं गच्छन्ति य एतदुपयंति ।

"Three sets of nine, three sets of fifteen, three sets of seventeen, three sets of twenty-one, made up the period of twelve years for Prajāpati. With this (*observation*), Prajāpati attained the means of producing all (*the years*). Those who follow this procedure will have the means of producing all (*the years*)."

Likewise, the period of 36 years which the school of the Sāktyas are stated to have observed is thus described in the same work, xxv. 7.].

नव त्रिवृतस्संवत्सरा नव पंचदशा नव सप्तदशा नवैकविंशाश्शाक्त्यानां षटत्रिंशत्संवत्सरम्।

"Nine sets of nine, nine sets of fifteen, nine stes of seventeen, nine sets of twenty-one, made up thirty-six years for the Sāktyas

Likewise, a third minor period of a hundred years of the Sādhyas is thus described in the same work, xxv. 8. 1. 2 :--

पंचविंशतिस्त्रिवृतस्संवत्सरा; पंचविंशति: पंचदशा: पंचविंशतिस्सप्तदशा: पंचविंशतिरेकविंशास्साध्यानां शतसंवत्सरम् । साध्या वै नाम देवेभ्यो देवा; पूर्व आसन् त एतत्सत्रायणमुपायन् तेनार्ध्नुवन् ते सगवस्सपुरुषास्सर्व एव सह स्वर्गं लोकमायन् एवं वाव ते सह स्वर्गलोकं यांति य एतदुपयांति ।

"Twenty-five sets of nine, twenty-five sets of fifteen, twenty five sets of seventeen, twenty-five sets of twenty-one, made up- the one hundred years of the Sādhyas. The Sādhyas were gods earlier than other gods: they obseved this session of one hundred years; they prospered thereby; and they all attained the heavenly world with their cows and men. Verily do those who observe likewise reach the heavenly world.

So far as numerical riddles are concerned, there is no difference between the above three passages and the one in which the period of a thousand years of the Viśvasṛiks has been described in the *Tāṇḍyamahābrahmaṇa*. Hence the above three passages may be interpreted in the same way as I have explained the last passage in my *Vidic Era*. Three, nine, or twenty-five sets of nine periods of five days each or of forty-five days, which form the difference between four lunar and solar years, are equivalent to 12, 36, or 100 solar years respectively. Similaly, three, nine, or twenty-five sets of such 15 days as remain after we deduct a

month from 45 days in every cycle of four luni-solar years, are equivalent to 12, 36, or 100 years respectively. Likewise, three nine, or twenty-five sets of 17 days which form the difference between four of Jupiter's years and four solar years, are equivalent to 12, 36, or 100 years respectively.[33] Since twenty-one days form the difference between four Sāvana years and four solar years, three, nine, or twenty-five times twenty-one days are equivalent to 12, 36, or 100 solar years respectively.[34]

It should be noted how the periods of 12, 36, 100, and 1000 years are connected with Prajāpati, the Sāktyas, the Sādhyas, and the Visvasṛiks, respectively. If the above four passages had been meant to be mere formulae rather than traditional statements of the actual practice of Prajāpati and the three priestly schools, then there would have been no necessity to mention them. There is no reason why the author of the *Tāṇḍyamahābrāhmaṇa* should go so far as to connect a formula, if it was a mere formula at all, with the Sādhyas, whom he has clearly described as a school of ancient priests. It follows therefore, that the periods of 12, 36, 100, and 1000 years are years of the Vedic era, actually counted by Prajāpati and the three successive priestly schools in terms of the number of times they intercalated twenty-one days or cows.[35] It is thus clear that the Vedic poets were quite familiar with the true solar year of 365¼ days and were adjusting the sāvana year to it by adding 21 days once in every four years, and that they kept an account of the number of intercalations, calling it the Gavām-Ayana or "Cows Walk." If there is still any doubt as to the precise significance of the term Gavām-Ayana, it will be removed by the evidence which I may perhaps set forth in a subsequent article on the Vedic era and chronology.

FOOT NOTES

[1]From पचं to सावनात्परो (for रं) - and perhaps farther seems to be a metrical quotation from some other work; with one or two words separated, and one omitted.—J. F. Fleet.

[2]*Varga* is not fairly to be rendered by 'cycle' is *yuga* or *chakra*: *varga* is a 'group, class.'—J. F. Fleet.

[3]*Upasad* : lit 'the sitting down, waiting for the arrival of the final sacrificial day.'

[4]*Samsthā*; lit. a starting or abiding together.

[5]*Trikadruka* is the name given to a unit of three days, of which the first day is called *jyotis*, 'light', the second *go*, 'cow', and the third *āyus*, 'life'. *abhiplava* is the name given to a unit of six days, of which the first three days are named like the *Trikadruka* days and the last three days are called *go*, *āyus*, and *jyotis*.

[6]*Svarasāman* is a name given to the three days before and after the central day of a sacrificial session, Special Sāma-chants are sung on these six days. If the *Trikadruka* days were considered as identical with the *Svarasāman* days, which are strictly observed immediately before and after the central day of a sacrificial session, the other days of the session would be counted in periods of six days each. This appears to be the meaning of 'an independet place for the *Trikadruka* days.'

[7]The 17 nights seem to me to be the nights of 6 *Svarasāman* days plus 6 Trikadruka days plus 5 *Abhiplava* days.- -J. F. Fleet.

[8]See Calendar, Form II. below.

[9][I do not see how *saṁbhārya* can be fairly rendered by 'intercalary'. It means 'that which may be brought together', and seems to mean, rather, 'the two months which are susceptible of contraction by shortening.'— J. F . .

[10]See Calendar, Form III. below.

[11]See Calendar, Form I., and for the year of 366 days, see Form IV below.

1. [The text treats here in a somewhat obscure manner of *both* the Sāvana year of 360 days *and* the sidereal solar year of 366 days. The latteris not mentioned as one of the five classes of years in the beginning of the passage. The text seems to suggest that the Sāvana year, before being regarded as 30 days × 12, was a sidereal year of 27 × 13 1/3 days, and that the year of 366 days, 27—13 5/9, was a refinement of it, as a result of experience showing that the sun required 2/9 of a day more time to pass through each *nakshatra*— J. F. Fleet.

[13]See Calendar, Form IV. below.

[14]The motion from South to North and back again, which the sun seems to have in passing from solstice to solstice, is transverse, at right angles, to his actual motion from West to East through the *nakshatra*.— J. F. Fleet.

[15]See Note 18. above.

[16]See Calendar, Form I and II.

[17]*Ibid*, Form III.

[18]That is, nine days before the central day and nine days after it.

[19]See Calendar, Form IV.

[20]This is what is called *utsargiṇām ayanaṁ*, which is described in the *Krishṇa Yajurveda VII* 5,6.

[21]It should be noted here that according to this school a month is made to consist of four *Abhiplavas* of six days each and a *Pṛishṭhya* of six days closing the month. According to the commentary of Agnāisvāmin on this Sūtra, it is the *Ukthya* days that are omitted. Accordingly, three days are omitted in each month, thus making it consist of 27 days. See Calender, Form V. below.

[22]Agnisvāmin quotes a passage on the authority of which the day with the Ekatrikastoma is omitted. Hence, according to this school, the month seems to consist of only 29 days. See Calendar, Form VI. below.

[23] See Calendar, Form VII. below.

[24]Like *Abhiplava*, *Pṛishṭhya* is also a name given to a period of six days which are called : (1) Rathāntara, (2) Bṛihat, (3) Vairūpa, (4) Vairāja, (5) Sākvara, and (6) Raivata, after the names of the Sāma-verses recited on those days. In some schools, the last six days of each month are observed as *Pṛishṭhya*.

[25]The twelfth month, when recast in the form of Gavām-Ayana, consists of three *Abhiplavas* of six days each and a period of *Dvādaśāha* or twelve days. In order to make this month also consist of 29 days, they make the last day of the second *Abhiplaha* the first day of the third *Abhiplava*. See Calendar, Form VIII.

[26]As each month of the year is made to consist of 29 days (total 348), the deficiency in the year amounts to twelve or seventeen days according as we take the Savana year of 360 days or a solar year of 365 days for comparison. It is clear, therefore, that the twelve or seventeen days regarded as *Dikshā*-days are no other than intercalary days required to make up the year in observance. Compare *Aitareya-Brāhmaṇa* iv, 4, 24; and *Atharvaveda*, iv, 11, 11; iv 15, 13; and iv, 16, 6, quoted above.

[27]Those who observed the twelve days in this way seem to have been adding them at the close of the year.

[28]Agnishtoma and Ukthya are two forms of sacrifice: the former is a simple one-day sacrifice in which a he-goat, sacred to Agni, is immolated and twelve hymnal verses are chanted, the latter requires the immolation

of a second victim, a he-goat to Indra and Agin, and the chanting of fifteen verses.

[29]See Calendar Form IX., p. 71 above.

[30]There is also a fifth, of 324 days, see p. 50 above.—Dr. Fleet.

[31]An Ahina sacrifice extends as far as 11 days, and sessional sacrifices from the 12th day onwards, Nidāna, ix, 6; on the 11th day the night falls: Nidāna, ix, '8.

[32]J. R. A, S., 1909, p. 478.

[33]It is practically, impossible that there can have been any Jupiter's years in Vedic times. Much better omit his, which seems quite superfluous. If there *were* any Jupiter's years then, they would be the beliaeal rising years,'each of 399 days—Dr. Fleet.

[34]These cyclic periods are also mentioned in almost all the Śrauta-Sūtras; see, *Saṅkhāyana*, xiii, 28.5.8.

[35]It is probable that though based upon different units of intercalary days, these three cycles are here expressed in terms of the unit of twenty-one intercalary days, as though these cyclic years were consecutive years.

The Ayanas or Sattras

The word Ayana literally means 'going, movement'; and when combined with such words as *gavām*, 'of cows', and *jyōtishām* 'of lights', it means 'the movement of cows' and 'the movement of (*the heavenly*) lights.' We have already seen how the Vedic poets used to call the first day of their *Shaḍaha* or six-days' period by the name *jyotis* 'light', and the second day by the name *gō*, 'cow'. It follows, therefore, that the terms *Gavam-Ayana* and *Jyōtishām-Ayana* mean 'the march of days." The question is: what days? ordinary days or special days? Almost all oriental scholars seem to regard the days as ordinary ones. And the sacrificial year of 360 or 361 days described in all the Srauta-Sūtras under the name ot Gavām-Ayana, with special chants; recitations, and rites for each day, has been accordingly taken by them to mean an ordinary year.

But there is evidence to indicate that this is not the sense in which the Vedic poets used the term. We have already seen how, in describing the four forms of Gavāma-Ayana,the author of the Nidāna-Sūtra has specified the suppression and intercalation of days as the chief feature of the *Ayanas*. We are told to suppress or omit nine day's from the sāvanā year of 360 days in order to form a sidereal lunar year of 351 days, which is a year of 13 months each of 27 days. We are also told of the synodic

lunar year of 354 days with an impliance of 12 intercalated days, and of the cycle of 37 or 38 months with 18 intercalated days, towards their adjustment with the sidereal solar year of 366 days. We are not told, however, the precise meaning of the term Gavām-Ayana. From the way in which the author of the sūtra has explained the four forms of Gavām-Ayana, we may interpret it in three different ways: we may take it to mean the four ordinary years, the sidereal lunar year of 351 days, the synodic lunar year of 354 days, the sāvana year of 360 days, and the sidereal solar year of 366 days; or we may take it to mean the suppressed period of nine days, and the intercalary periods of 21, 18, and 21 days, of which the intercalary period of 21 days is, as we have already seen, mentioned in a later chapter of the same sūtra.[1] But Lityāyana seems to take the term in the sense of an intercalary period: in chapters 5 to 7 of the fourth book of his Srauta-Sūtra, he proposes to discuss the varieties of Gavām-Ayana, and describes the rites and recitation p·rtaining to the periods of 12 and 21 days; while in the 8th chapter of the same book, he proceeds to discuss the varieties of Jyōtishām-Ayana, and enumerates the various kinds of years and the intercalary days necessary to adjust them. From this it is clear that of the three terms, Saṁvatsara, Jyōtishām-Ayana, and Gavām-Ayana, the first means an ordinary year of 351, 354, or 360 days, the second the year with an intercalary period, and the third an intercalary period made up of any number of intercalary days. That the terms Saṁvatsara and Gavām-Ayana are by no means synonymous, is also clear from what Sāṅkhāyana says about the repetition of Gavām-Ayana. He says (xiii. 27. 5) - मभ्यासो वहुसंवत्सरे गवामयनस्य : "when the number of years is great, repetition of Gavām-Ayana is to be observed." It is clear that, if the terms Saṁvatsara and Gavām-Ayana had been synonymous, there would have been no necessity for such a remark. I need not point out how the sūtra would be meaningless if the two terms Saṁvatsara and Gavām-Ayana were taken synonymously. Nor can we take the term Gavām-Ayana in the sense of a year with an intercalary period; for in that case the sūtra would mean that, when the number of years is great, all those years with their intercalary periods should be repeated —a statement which is unpractical. It follows, therefore, that the term Gavām-Ayana

means an intercalary period and an intercalary period alone, no matter what may be the number of days constituting that period. For the formation of Gavām-Ayana, two units of intercalary periods seem to have been selected: they are (1) a period of 11 or 12 days inserted at the close of every year, and (2) a period of 21 days inserted in the middle of every fourth year.[8] The sacrifices that were performed during either of the two intercalary periods are called *Sattras* or sessional sacrifices. It appears that when such sessional sacrifices were not performed,—say, for about a hundred years—a sacrificial session extending for 100 × 11 or 100 × 12 days, or 25 × 21 days, was held once for all. We shall see presently that, instead of holding the session during as many days as constituted the intercalary periods left in abeyance, they seem to have limited the number of days by substituting one day for each intercalary period. Thus a session of 100 days or of 25 days seems to have answered the purpose of 100 × 12 days or of 25 × 21 days in a hundred years. Also it appears that when one or more such single intercalary days were being celebrated, all the past intercalary days were recalled and celebrated along with the new ones, and that the whole session was termedGavām-Ayana. Those who had different units of intercalary days seem to have followed the same procedure, with the difference that, instead of substituting single days for their units of intercalation, they used to hold their sacrificial session for as many days as there were in all their units of intercalation. The three sacrificial sessions of the Tapaschits, for example, consist of four, twelve, or thirty-six years corresponding to the 360 days composing a Gavām-Ayana year. These three sessions are so arranged that twenty-four, seventy-two, or two-hundred and sixteen months form the first half of the session, and the same number of months form the second half. This is what the Nidāna-Sūtra, X. 9, says about them :

अथैतन्महातापश्चितमित्याचक्षते चत्वारो दीक्षासंवत्सराः चत्वार औपसदाः चत्वारस्सौत्या तस्य कल्पो गवामेवायनं कुर्वेयुः अपि वा एतस्मैव पक्षसी अभिवृद्धे स्याताम् त्रयोविंशतिरयन-मासाः पूर्वे पक्षसि स्युर्द्वाविंशतिरुत्तरे अपि वैतान्यव प्रथमानि चत्वारि समस्येत यथा त्रीणि संवत्सरे इति अपि वा ज्योतिष्टोमायनमेव कुर्वीरन् एतेषां यन्मन्येरन तदपि वा यथा गणसंवत्सराणां तथा कल्पं कुर्वीरन् अथैतच्चातयानां षट्त्रिंशत्संवत्सरम् तरसपुरोडाश मघसंरोधात यदनः पुरुषः तदन्नदाम्य देवतेति ते यन्मांसमया वा श्यामाकमयावोमे अपन्ने हविष्ट वमिति

अथैतानि महासत्राणि देवानामेव दीर्घायुषो देवा इति मनुष्याणामपि सिद्धानि स्युरित्यपरम बहवस्सन्निविश्य सुनुयु: पुत्रा: पौत्रा: प्रपौत्रा इति तानि खल्वतिरात्राणि अविषुवत्कानि ऊर्ध्वायनानीमानि भवति तत्र यदतिरात्रं वा विषुवतं वाऽकरिष्यत लुब्धो रोहोऽभविष्यत तथापि न कल्पेनादेशो विज्ञायते न ब्राह्मणेन, अथाप्येव पुराणं वेदयते अथाप्येकविंशोऽस्तत-स्स्तोमानां भवतीति

"This is what they call the major session of the Tapaśchits. Four years are spent in performing the initiatory rites; four years in Upasads; and four in pressing the Sōma plant. Its arrangement is thus ;—They may repeat the Gavām-Ayana four times (*for each of the three sets of four years making twelve years*); or else the two wings or parts of the original Gavām-Ayana may be so lengthened that twenty-three *Ayana* months fall in the first wing or part of the session and twenty-two months in the second part."[3]

"Or else the minor session of a year of the Tapaśchits may be repeated four times, so that with three such sessions the major session of twelve years is completed or else they may observe the session in the Jyōtishṭōma way (*i.e.*, the Gavām-Ayana); or else they may hold their session in each year seriatim (*gaṇasaṁvatsarāṇāṁ kalpa*)[4].

"Then the sacrificial session of thirty-six years of the Sāktyas. The foodstuff used in this sacrifice is flesh instead of cooked rice; for the Inner Man is the food-giving deity of this sacrifice. Usually these two foodstuffs, flesh and rice, , are the sacrificial offerings.

"Those long sessions are meant only for gods, for the gods (*alone*) are long-lived. Others think that they are possible also for men; according to them, many persons, such as sons, grandsons, and sons of grandsons undergo initiation successively and press the Sōma-plant. These Atirātra days are not accompanied by the central day of the year and constitute what is called *Urdhvāyana*) or 'lengthened year.' If the Atirātra day or the central day is celebrated (*one after another*) then the desired ascending order (*in the era or years*) is secured. No rule about these sessions is laid down in the Kalpas or in the Brāhmaṇas. Still they teach us this ancient doctrine (namely the Gavām

Ayana and other varieties). Of all the units of intercalary days celebrated by chanting as many Sāma-verses as the number of days in each unit, the unit of twenty-one intercalary days is the last."

The most important points that are to be particularly noticed in the above passage are : (1) the duration of the session of the Tapaśchits as compared with that of the Gavām-Ayana: (2) the spreading out of the session: (3) the question raised by the author of the Nidāna Sūtra as to the possibility or impossibility of all the sessional sacrifices being observed by a single man, however, long lived he might be; and (4) the absence of the central day of the year in these sessions. We shall presently see how in the place of twelve days celebrated by others, probably at the close of every fourth year, some celebrated only a single day. It follows, therefore, that if the latter counted 360 such single days, the former would count twelve times as many days. This is what appears to have been meant by the statement that the twelve-years' session of the Tapaśchits is equal to twelve times the duration of the Gavām-Ayana, In his commentary on the Srauta-Sūtra of Aśvalāyana, Gārgyanārāyaṇa has clearly stated that the twelve-years' session of the Tapaśchits may be so spread out that seventy-two months shall fall in the first half of the session and the same number of months in the second half.[6] Likewise, the session of thirty-six years of the Tapaśchits or of the Sāktyas. This amounts to saying that, just as twelve twenty-one days are inserted in the middle of an ordinary year, these sessions of four, twelve, or thirty-six years are also inserted in the middle of an ordinary year. It is clear, therefore, that all these sessions are intercalary periods, not ordinary years. Had these and other sessions been ordinary years, the question raised by the author of the Nidāna-Sūtra about the possibility of all the sessional sacrifices being performed by a single man would not have cropped up at all; for it is quite possible for a man to live for 56 or 60 years, so that he may commence a sacrifice in his 20th or 24th year and bring it to a close after 36 years. It follows, therefore, that these sessional days are not ordinary consecutive days, but periodical intercalary days. We shall see that the Vedic poets knew that the solar year differed from the

synodic lunar year by 11¼ days and that the Sāvana year was less than the solar year by 5¼ days. When these 11¼ days made a twelfth day, as they would in every fourth year and when the 5¼ days amounted to 21 days in the course of every four years, the Vedic poets performed their sessional sacrifice on the 12th or the 21st day and counted these days apart under the name of Gavām Ayana. Accordingly a Gavām-Ayana of 360 days is equal to $360 \times 4 = 1440$ years. If, instead of counting the 12th day apart, all the 12 days were counted apart, as the Tapaśchits seem to have done, even then the session of 12 years would still be equal to $12 \times 360 \times 4 \div 12 = 1440$ years. It is clear that no man can possibly live for 1440 years and perform the sacrifice of so long a session. Similarly, for each day counted by the followers of the Gavām-Avana, the Sāktyas seem to have counted 36 days in every cycle of four years, and to have thereby counted 36 years in the course of 1440 years. Clearly, then, the performance of all these sessional sacrifices, and the counting of such great periods of years, was the work, not of one man, but of generations consisting of sons, grandsons, and sons of grandsons and others, as stated by the author of the Nidāna-Sūtra. It follows, therefore, that Jaimini's interpretation of the 250 twenty-one days' session, or of the one thousand years' session of the Viśvasṛiks, in the sense of a session of 1,000 days, in order to make the performance of all the sessional sacrifices possible for a single man, is entirely wrong, and quite against ancient tradition as set forth in the Nidāna-Sūtra. Scholars who have been entertaining doubts about the Vedic chronology should pay particular attention to the statement of the author of the Nidāna Sūtra, that these sessional days are all Atirātra days with no central day, and that, if, the Atirātra day or the central day is counted apart seriatim, the desired ascent (*lubdhō rōhah*) in time is secured. This is clear proof that the Vedic poets kept an era of their own in terms of Atirātra days or of central days.

In explaining the above passage, I stated that, corresponding to the celebration of a single day by the followers of the Gavām-Ayana, others, like the Tapśchits, celebrated twelve intercalary days at the close of every fourth year. This statement requires proof; and that proof is contained in the following passage of

the Nidāna-Sūtra, IV, 12:—

अथातो गवामयनम् तदेक एकेनाह्नामिविदधते ज्योतिष्टोमेन अथैके अतिरात्रचतुर्विंशन-बाहृत्रातिरात्र ईति कृत्वा ज्योतिष्टोमेनैव संस्तृणंति अथ के गोआयुषी दशरात्रमित्युपाहरंति एतं संवत्सरप्रवर्हं ईत्याचक्षते शंखाहृतमिति च ।

"Then as regards the Gavām-Ayana:—

Some celebrate it in one day in the Jyōtishtōma way; others spread it also in the Jyōtishōma way over twelve days, of which the first day is an Atirātra day with the recitation of 24 verses, followed by nine days, the day of Mahā-Vrata, and a final Atirātra day; some others hold it for twelve days made up of a period of two days termed *gō* and *āyus*, and another period of ten days. This period of twelve days they call 'the growth of the year, ' and celebrate it by blowing a conchshell."

From the Nidāna-Sūtra, X, 1, we have learnt that the periods of 12 and 21 days are two intercalary units. From the above passage we have learnt that the session of the Gavām-Ayana may be celebrated in one day, *viz*, the 12th day or the 21st day, or during all the twelve days. It appears that like the twenty-first day, which is, as we have already seen, the product of four quarter-days at the end of four solar years, the twelfth day is also the product of the same four quarter-days. That it is the product of four quarter-days, seems to be implied in the following passage of the Nidāna-Sūtra, IX, 6: —

अथात एकादशरात्र : एकादशरात्रांता अह्नीना द्वादशाहप्रभृतीनि सत्राणि किमेकं स्थान-मंतरीयामिति ऐकादशरात्रं करोति ।

"Then as regards the eleven nights :—

The *Ahina* period does not extend beyond eleven nights. Sessional sacrifice is continued from the twelfth day and onwards He observes the *Ahina* period only for eleven days, lest he might encroach upon one place (*one day*) more."

The above passage clearlo shows that the difference of eleven full days between the lunar and the solar years constitutes the. period of *Ahina* sacrifices, and that the twelfth day is an extra day, scrupulously excluded by the sacrificer from the *Ahina*

period. By way of distinguishing between the two kinds of sacrifices, the *Ahīna* sacrifices and the *Sattra* sacrifices, the author of the Nidāna-Sūtra says in IX., 9:—

अथायं द्वादशाहोऽहीनो भवती ३ सत्रमिति अहीनो भवतीत्याहु एको दीक्षेतेति अथाप्या-हीनिकान्यहानीत्यहाचक्षते दाशरात्रिकाण्यहानि ... ... त्रयोऽहीना इति धानंजप्य, एकाहाहीन: अहीनाहीन : सत्राहीन इति अयं ज्योतिष्टोमोऽतिरात्र: षोडशिमानेकाहाहीन: अत्र हि न किंचनैकाहिकं कर्म हीयत इति द्वादशाहोऽहीनाहीन: अत्र हि न किंचनाहीनिकमहर्हीयत इति गवामयनं सत्राहीन: अत्र हि न किंचन सात्रिकमहर्हीयत इति ।

"Well then! does the period of twelve days constitute the *Ahnīa* form of sacrifices, or the sessional form? They say that it constitutes an *Ahīna* period; and they declare that one person only should undergo the rite of initiation into it. But others say that the period of ten days constitutes an *Ahīna* period . . . . Dhānaṁjapya says that there are three forms of *Ahīna* sacrifices: (1) an *Ahīna* sacrifice of one day; (2) an *Ahīna* sacrifice continued for several *Ahīna days*; (3) *Ahina* sacrifices taking the form of sessional sacrifices. An *Atirātra* sacrifice with the recitation of sixteen verses, performed in the Jyōtishtōma way, is an *Ahīna* sacrifice of one day; it is so called because none of the rites usually performed in a single day are neglected here. The twelve-days' sacrifice constitutes the *Ahīna* sacrifice of several days; it is so called because none of the days constituting the *Ahīna* period is here lost. Gavām-Ayana forms the *Ahīna* form of the sessional sacrifices; it is so called because none of the sessional days is here lost (*hīna*)."[6]

This apparently meaningless discussion about the distinction between the *Ahīna* and *Sattra* sacrifices ends in the lame conclusion that the word *Ahīna* means the absence of the loss of a day or part of a day, and that it is applicable to all kinds of sessional sacrifices in which neither a day nor part of a day is omitted. It seems probable that the eleven full days, which form the difference between the lunar and the solar years, were originally called *Ahīnas* or 'not-incomplete' ones, for the reason that those eleven days are not as incomplete as the one-fourth part of a day at the end of every solar year. It is clear, therefore, that a series of the intercalary periods of twelve days, or a series

of the twelfth Atirātra days, is taken to constitute a *Sattra* called Gavām-Ayana. Similarly, a series of the intercalary periods of twenty-one days, or a series of successive twenty-first days, is taken to constitute another form of the Gavām-Ayana. As the 12th and 21st days are the product of the four quarter-days at the close of any four consecutive solar years, the interval between any two successive twelfth days or twenty-first days must necessarily be four solar years. That a sacrificial session is made up of a series of such 12th or 21st days, is clearly stated in the Nidāna Sūtra, III . 7 :—

अहीनैकाहसमासा ह्येव सत्राणि भवति.

"The assemblage of the single days closing the *Shīna* period constitutes sacrificial sessions." That a series of successive twelfth days are termed Atirātras, is implied in the following passage of the Nidāna-Sūtra, ix., 10 :-

अथातस्सत्राणि, तेषां द्वादशाहः प्रथमः तस्मिन्नुपकृतानि. तत्र द्वे उपगिस्थाते अंतरेणातिरात्रौ च दशरात्रं च यत्रैकेनाह्नार्थो भवति त्रनमाहरेदेतदेकार्थे दृष्टमिति. तस्य तदेव स्थानं यत्संवत्सरे. द्व्यहार्थे गो आयुषी तयोस्तदेव स्थानं यत्संवत्सरे. त्र्यहार्थे त्रिकद्रुकान चतुरहार्थे अतचतुर्थान् पंचाहार्थ अभिप्लवपंचाहं. षडहार्थे अभिप्लवस्संपल्वते. एतेन न्यायेन एष एकोक्रमते, आ चत्वारिंशद्रात्रात्. उपचीयमानेष्वहस्सु. रोहेणोपचयः प्रवर्तते. एन रात्रिसत्रन्याय तारकल्प इत्याचक्षते.

"Then the *Sattras* :—Among them the period of 12 days is the first (*unit of a session*). In that period are observed all the functions of sessional sacrifices. There are two distinguishing features of it; between the two *Atiratra* days, one at the commencement and the other at the close, comes the period of ten days. When the purpose of the sessional sacrifice is served only by a one day's rite, the sacrificer should perform it in the form of the *Mahāvrata* day, for it is seen to serve the purpose of a single day: that place which such a single day has in the body of the year is irs true place. When he has to observe two days, he should celebrate such days as are known by the names *gō* and *āyus*; the very place which the two days have in the body of the year is their true place. When he has to observe three days, he should celebrate the three days known as *Trikadrukas* (1

jyōtis, 2 gō. 3 āyus). For four days, he has to observe four *Mahāvrata* days. For five days, he should observe the first five days of the six *Abhiplava* days. For six days, there come the six *Abhiplava* days. In accordance with this principle, the period of sacrificial session progresses by the addition of single days up to forty nights When the number of days is on the increase, the increased number of days is observed in the same ascending order. This they call the principle of sessional nights (*rātri-sattra-nyāya*)."

It is highly necessary that we should take into full consideration all that has been stated in the above passage. We know that a sacrificer proceeding to perform a sessional sacrifice may hold it either for twelve days or on a single day. Now we are told that. when he wants to finish it in one day, he should treat the day as the *Mahāvrata* day, which is the eleventh among the twelve days. By saying that the very place which it has in the body of the year is its true place, the author of the sūtra seems to imply that, when a single day is celebrated, it should be counted as the last but one day of the year. Since this day is also one of the days which constitute *Rātrisattra* or an *Atirātrasatra*, 'a session of excessive nights,' it is also called *Atirātra* like the twelfth day. For purposes of ritual convenience, the eleventh day seems to have been selected and termed the twelfth day. Next we are told of the ceremonial forms in which two days, three days, and so on, are to be celebrated. That these days, from two to forty and from forty and upwards, are not the days of the ordinary year, but are successive twelfth days treated as the eleventh or the last but one day of the cyclic year, is clear from the sessional name of *Rātrisattra* or *Atirātrasattra* 'session of excessive nights' which those days go to form. Also from what the author of the Nidāna-Sūtrā says in another place, we can clearly understand that the days constituting the *Rātrisattra* are not the consecutive days of an ordinary year, but are such eleventh or twelfh days of the cyclic year as were once identical with new or full-moon days. In discussing the various forms of sacrifices and recitations to be performed in the sacrificial session of 33 days, the author of the Nidāna-Sūtra distinctly says that the days constituting a sacrificial session represent

several full or new-moons, and indicate the lapse of several years In order to understand the meaning of the passage, it is necessary that we should know the different plans of arranging the 33 days with their technical names for sacrificial purposes. According to the Kṛishṇa-Yajurvēda, the period of 33 days is split up into an *Atirātra* day, followed by three groups of five days each and the central day followed by fifteen days. But the author of the Nidāna-Sūtra makes the Viśvajit day or the central day to occupy the 26th place in the series as shown in the adjoining table. On this central day, the priests have to recite all the six *pṛishṭha-stotras* and all the ten *stomas* or collection of verses, such as nine verses, fifteen verses, seventeen verses, twenty-one verses, twenty-seven verses, thirty-three verses, twenty four verses, thirty-six verses, forty-four verses, and forty-eight verses. We can now proceed to interpret the passage, which runs as follows:-

According to the Kṛishṇa-Yajurévda

[J=*jyōtis*; G=*gō*; A= *āyus*]

1, *Atirātra day*

J	G	Ā	G	Ā
2	3	4	5	6
7	8	9	10	11
12	13	14	15	16

17, *Viśvajit day*

J	G	Ā	G	Ā	G
18	19	20	21	22	...
23	24	25	26	27	28

29-32, *Chhandoma days*

33, *Atirātra day*

According to the Nidāna-Sūtra

1. *Atirātra day*

J	G	Ā	G	Ā
2	3	4	5	6
7	8	9	10	11
12	13	14	15	16
17	18	19	20	21
22	23	24	25	26

27, *Viśvajit day*

28	29	30	31	32

33, *Atirātra day*

अथता अंजनाभ्यंजना: प्रजापतीण्सामुपकृता: तत्र सर्वस्तोममुपहारयति. एषोऽरूभ स्तोमत: संस्थात पृष्ठत: इति तत् यच्छड्विशस्थानमेवमपर्वविलोप इति. उतमावभिल्पवावावृती भवतो ३ अनावृत्ताविति शौचिवृक्षि: न ह्यावृत्तिविभ्रायते. अथाप्यमध्ये सर्वस्तोमो मध्यस्थानो विषुधानिति आवृत्ताविति गौतम. प्रतिष्ठाकामसत्रे एतस्मिन् स्थाने कृतं करिष्यन्भवति इति. यद्द तदनादिष्टावृतिरिति. नाभिल्पवस्यावृति: कचनादिश्यतेऽर्थं एवावतर्यतीति यद्वा एतदमध्ये सर्वस्तोमइत्यपर्वविलोपायैनभ्दवति. पेण्यामस्थामध्ये विषुवतं यथा त्रयादशरात्र संसत्स्वति संवत्सरसम्मितासु. प्रायणीये चतुर्विंशं प्रतिषिध्यन् त त्रिवृदेव कार्यमित्याह् निष्पन्नचोदितत्वान् एतदपूर्वं प्रायणाय चेति. स्तोमबिकारमेके तस्यैवाधिकराच्चतुर्विंशं त्वेव कार्यमिति निष्ठा. तथाहि बाह्मणं ता एतास्संवत्सराप्तिमुपाकृतास्तत्र यदेतान्यहानि एवं संवत्सरस्य प्रयुक्ततमान्यहानि भविष्यतीति. तृतीयेऽभिल्पवे ईषोवधीयसपते कुर्यान्नकुर्यादिति. न कुर्यादित्याहु: पृष्ठयसन्निपातिके इमे भवत: न चेह पृष्ठयो भवतीति. कुर्यादित्यपरं नानापर्वणोरिमे संतानार्थे भवत: नानापर्वणोरेवैते अहर्गणश्चैकाहश्च. भूयसां चैवं सांवत्सरिकाणां द्रव्याणामविप्रयोगो भवति.

Then these rites of anointing the eyes and other members of the body are intended to secure Prajāpati [Father Time]. On this day the priest recites all the *Stomas* or systems of chants, for this day must not be wanting in its *Stomas*, its basic forms of sacrifices, and its recitations called *Prishthyas*. This day occupies the 26th place [leaving the Atirātra day out of count] in the session, and does not therefore fail to represent the day of full or new moon (*Parva*). Are the last two of the three *Abhiplavas* [of five days each in the first part of the session] repeated, in the

second part?, or are they not repeated ? Sauchivṛikshi says that they are not repeated, inasmuch as their repetition is nowhere prescribed, and the central day, which with its recitations usually occupies the middle place (*in sacrificial sessions*), does not take this central place in this session. But Gautama says that they are repeated. On this day of the session which is intended to secure a firm footing for the sacrificer, the priest will be engaged in performing what has already been accomplished. As regards the statement that the repetition of the *Abhiplava* days is not prescribed, it is true that it is nowhere prescribed, because their repetition is merely a mental work. As to the celebration of the day in a place other than the central place in the session, it is merely to represent by it the *Parva*-day (*i. e*, the new or full-moon day with which it was once identical). Also we have seen the celebration of the central day outside the central place, as for example in the session of thirteen days,[7] corresponding to a number of years. Prohibiting the recitation of twenty five-verses, he has enjoined the recitation of nine verses on the first day, for it is prescribed for a known day and the first day is a new initial day. Others say that the chant of twenty-four verses is merely a variety, and that it may be recited on the first day as usual. Accordingly the Brāhmaṇa says that these nights are intended to secure the year, and that these days of the session are exactly such as once constituted the year. Should he recite the Sāma-verses known as Ishövridhīya and Samanta on the third *Abhiplava* days, or should he not ? They say that he should not recite them, for they are recited at the junction of *Abhiplava* and *Pṛishṭhya* days (*at the end of a month*); and here in the session of thirty-three days, there are observed no *Pṛishṭhya* days. Others say that they are to be recited because they are intended to signify the continuous succession of various *Parva*-days, and because the succession of several (*ahargaṇa* means a total sum of days) or of a one single day and is intended to signify various *Parva*-days (*that had already passed*). Thus it is that the manifold functions of several years are inseparably brought into a connected whole."

Again, after discussing the necessity of reciting or not reciting the Sāma-Verses known as Yaṇva, Apatya and Śākvaravarṇa, on

the *Abhiplava* days forming part of the session of thirty-three days: the author of the Nidāna-Sūtra says:—

अथाप्येव संप्राप्योऽयं भूयस्सांवत्सरिकं द्रव्यमनुगृह्यत इति.

X, 3.

"Thus it (*the year or era*) is to be attained. The manifold functions of several years are thus brought into favourable consideration."

Again, in connection with the session of sixty-one days, the Nidāna-Sūtra says :—

अथैनदेकषष्ठिरात्रं संवत्सरसम्मितास्थानमेव. तत्र नवाहमभितः पृष्ठ्यौ करोति. एवं सर्वं सावत्सरिक द्रव्यमनुगृह्यत इति ।

X, 4.

"Then the session of sixty-one nights symmetrically corresponds to *or* implies a series of years. In the arrangement of the days of this session, the period of nine days is followed and preceded by six *Prishthya* days Thus all the functions of the years (*era*) are brought into consideration."

From the statement that the 12 or 36 years of the Tapaśchits cover so great a period of time that no man in his life-time can hold a sessional sacrifice during it, and from the statement that the sessional days represent various full or new-moon days and thereby imply a series of years, we can clearly understand that the Gavām-Ayana and other sacrificial sessions are all based upon different systems of intercalary days. We have already seen that the two important units of intercalary days are the periods of 11 days and of 21 days Accordingly the Nidāna-Sūtra says that at the end of each year the sacrificer should celebrate eleven days, so that all the days of the year are thereby represented and that this process should be repeated again and again. The passage in which this idea is conveyed runs as follows :—

अथ केनासस्तीर्णान्यभिविदधीत. अनिरात्रसत्रन्यायेनेत्याहु: यथा शतरात्रम् अपि वा दशरात्रं अंत चांते निधाय यथा सांवत्सरिकाणामह्नां समवहार: सिध्येत् तथा कल्पं कल्पंकुर्वति.

X, 5.

"Then how are the sessional days treated whose ritualistic arrangement is not known? They say that they are to be arranged following the principle of excessive nights consituting a session. Or else by celebrating at the close of the year ten days together with a Mahāvrata day, he should perform the sacrifice, so that all the days of the year are thereby recalled. This process he should repeat again and again."

From this it is clear that the Vedic poets were celebrating 11 days at the end of each synodic lunar year of 354 days From the Nidāna-Sūtra, X, 5, quoted above, we have learnt that there were others who were celebrating 5 days at the close of each Sāvana year of 360 days. Again, from the same passage we can understand that the periods of 12 and 21 days were taken as different units of intercalary periods. It follows, therefore, that there were four schools of astronomers during the Vedic times; a school who observed 11 days at the end of each synodic lunar year: a second school who celebrated 5 days at the end of each Sāvana year; a third school who observed 21 days of course at the end of four consecutive Sāvana years; and a fourth school who celebrated 12 days at the end of every fourth synodic lunar year.[6] It is clear, therefore, that the statement made at the close of the Taittiriya Brāhmaṇa, that 250 times 21 days denoted 1000 years for the Viśvasṛiks, is not a theoretical formula, but a result arrived at by regular counting made by successive generations of priests. Scholars may doubt the conclusion at which I have arrived in my *Vedic Era*, that the Vedic poets kept an era and counted 1840 years in it. But there is, at any rate, no reason to doubt that the Vedic poets had their own era and counted 1,000 years in terms of 250 intercalary units of 21 days each. It remains to find out the *terminus a quo* of these 1,000 years and settle the chronology of the Vedic period.

FOOT NOTES

[1]See Chapter II, above.

[2]See Nidāna-Sūtra, x, 1, quoted above.

[3]These forty-five months, together with the sixth, the seventh, and the last (*i. e.*, twelfth) month of the original Gavām-Ayana year inserted in all such cases, amount to forty eight months or four Gāvam-Ayana years—Gargyanarayanā's Commentary on *Āśvalāyana*, xii. 5, 14.

[4]This seems to refer to the intercalation of five days to each year: see Nidāna-Sūtra, x, 1. For other varieties of the session of the Tapaśchits, see Gārgyanārāyaṇa's Commentary on Āśvalāyana-Śrauta-Sūtra xii, 5, 14

[5]Āśvalāyana, xii, 5, 14.

[6]See also "Gavām-Ayana : the Vedic Era," pp. 60, 61.

[7]*Atirātra* day	1
Six *Pṛishṭhya* days	6
The central day with its recitations	1
Four *Chandoma* days	4
A final *Attiratra* day	1
	13 days

Krishṇa-Yaiurveda, VII, 33

[8]The Maitrāyaṇiya-Saṁhitā, however, refers to the existence of two more astronomical schools of a different kind. The Saṁhitā calls them Rituyājis and Chāturmāyasyajis. The passage in which they are referred to runs as follows :—

एकैकया वा आहुत्या द्वादश द्वादश रात्रीरयुवत. ता यावतीस्संख्याने तावतीस्संवत्सरस्य रात्रय: संवत्सरमेव भ्रातृव्यांद्युवते. वैश्वदेवेन चतुरो मासानयुवत. वरुणप्रघासै: परांश्चतुर: साकमेधै: परांश्चतुरस्तानेव भ्रातृव्याद्युवत. ऋतुयाजी वा अन्यश्चातुर्मास्ययाज्यन्यो यो वसंतोऽभूत्प्रावृडभुज्शरदभूदिति यजते स ऋतुयाजी अथ यस्त्रयोदशमासं संपादयात त्रयोदशमासमभियजते स चातुर्मास्ययाजी. ऋजून् त्रीनिष्ट्वा चतुर्थमुत्सृजेत ऋजूद्वौ परा इष्ट्वा तृतीयमुत्सृजेत. ये वै त्रयस्संवत्सरास्तेषां षट्त्रिंशत्पूर्णमासा यौ द्वौ तयोश्चतुर्विंशतिस्तत्षष्टिंशत्यधि तानस्यां चतुर्विंशत्यामुपसंपादयति. एष वाव स त्रयोदशो मासस्तमेवैतत्संपादयति तमभियजते.

Maitrayāṇiya-Saṁhita I, 10.8

With each oblation, he suppresses twelve and twelve nights. They (the oblations) are as many, when counted, as there are nights in the year. He suppresses the year from the enemy. With Vaiśvadevea sacrifice he

suppresses four (intercalary months); with Varuṇapraghāsa the next four: and with Śākamedha the next four. These are what he suppresses from the enemy. He who sacrifices for the seasons is a sacrificer of one kind, while he who sacrifices for a set of four months is a sacrificer of another kind. He who knows that what was the spring became the rains (which in turn became) the autumn (and so on), and who accordingly sacrificed for them—this sacrificer is one who is called to be a sacrificer for the seasons. He who gains the thirteenth month and sacrificer for the thirteenth month is one who is said to be sacrificer for the four months. Having sacrificed during three ordinary (Rijū) [months], he should omit the fourth. Then having sacrificed during (the next) two ordinary (months), he should omit the third. As to the three years there are, in them there are thirty six full moons, as to the two, in them there are twenty four. As to those (days) which except (an intercalary month in the thirty-six full-moons, he takes them to these latter twenty-four months. This is verily the thirteenth month. He gains it and sacrifices for it.

Conclusion

MEASUREMENT OF TIME

Sun governrs the most important factor of time. When and how the counting of time started, it is difficult to predict, but various forms scattered in Sūtras and Brāhmaṇas have been collected. The revolution of earth around the Sun governs calculation of years and the sequence of seasons. The revolution of the Moon around the earth governs the calculation of months and the rotation of earth around its axis forms the day and night.

The day in Indian calander containing astronomical and meteorological data is calculated in relation to *tithis* and *nakṣatras* for following the religious practices.

YUGA

Yuga mentioned in Ṛgveda as *daśame yuga* refers to short and long periods of time. In Vedic index it is refered as tenth decade Brāhamaṇa literature refers to four *Yugas i e. Kali, Sayana, treta* and *kṛta*. The terms *Samvatsara, parivatsara, ida-vatsara, id-vatsara* and *vatsara* are refered in Yajur Veda. The number of years in the *yugas* vary The different versions are given below.

	Kaliyuga	Dvāpara	Treta	Kṛtayuga
Brahmagupta	432,000	864,000	1,296,000	1,728,000
Aryabhata	1,080,000	1,080,000	1,080,000	1,080,00
Puraṇas	36,000	720,000	1,080,000	144,0000

YEAR

Intercalary lunar year consists 366 days. The intercalary month falls once in 30 solar months. The intercalary months are refered for adjustments in total number of days. The different years are depicted thus : –

Nakṣatra year : The spiral rising is the first visible rising of a *nakṣatra* after its union with the Sun when it is at a sufficient distance from the Sun.

Āditya year : It starts with *Sankrānti* and consists of one revolution of earth around the Sun. It starts in *Caitra.*

MASA

Ṛgveda refers to *māsa* quite repeatedly. Since the orbit of the earth is eliptical, the duration of solar months varies from 29-32 days. In case when two lunar months begin in a solar month, they are denoted as *aḍhika* and nija. These Sanskrit zodisigns are frequently mentioned as :—

Meṣa, Vṛṣabha, Mithuna, Karkaṭa, Siṁha, Kanyā, Ṭulā, Vṛśchika, Dhanuś, Makara, Kumbha, and *Mīnā.*

Months are of two types, Solar and Lunar. Solar month is the time required for the Sun to pass from one sign to another. The Lunar month is the time taken for one ful moon to the next.

PAKSHA

Pakṣa i.e., a fortnight is based on the revolution of Moon. *Kṛṣnapakṣa* (dark-half) ends with *amāvasyā* (new moon). *Śūklapakṣa* ends with *pournamāsa* (full moon). *Tuittriya Brāhamaṇa* refers to *Āyuh, Amṛtah, Abhijayan, Ardra-pavitraḥ, Dravinodaḥ, Harikeśaḥ, Janayan, Jivaḥ, Lokaḥ, Modaḥ, Medhyaḥ, Ojasvan, Pavitram, Prvaviṣyan, Promodaḥ, Pūtaḥ, Sahasvān, Sahīyan, Sahamāna, Svargah, Sudravinaḥ, Yaśah* and *Yaśasvān.*

Hindus adjust their religious festivals in relation to Sun . and

Moon. Their astrological order of the planets is Sun, Moon, Mars, Mercury, Jupitar, Venus and Saturn. There is also a concept of nine planets (*navagraha*) which include *Rāhu* and *Ketu.*

Brahmā is said to be born: a familiar phrase, to 'signify his manitestation, and, as the peculnar measure of his presence, a hundred of his years is said to constitute his life : that period is also called Param and the half of it, Parārddham.[1] I have already declared to you, Oh sinless *Brahmā*, that Time is a form of Vishṇu : hear now how it is appiled to measure the duration of Brahmā, and of all other sentient beings, as well as of those which are unconscious, as the mountains, oceans, and the like.

The Manu-smṛati (i 64) gives the following table : 18 *nimeshas* (winkings) = 1 *Kāshṭha*: 30 *Kāshṭhās* = 1 *Kalā*; 30 *Kalās* = 1 *muhūrta*; 30 *muhūrtas* = 1 *ahorātra* (mean civil solar day-night); 15 *ahorātras* = 1 *pakṣa*; 2 *pakṣas* = 1 *month*; 2 months = 1 *ṛitu* (season); 3 *ṛitus* = 1 *ayana*, or ½ of solar year.

Another table runs as follows: 10 *gurv-akśaras* (long syllables) = 1 *prāṇa* (breath): 6 *prāṇas* = 1 *vināḍī* or *pala*; 60 *vināḍīs* = 1 *ghaṭikā*, *nāḍī*, or *daṇḍ i*; 60 *ghaṭikās* = 1 *aho-rātra* (day-night).

The Purāṇas gave different systems. Here *the Vishṇu-purāṇa* (*I. iii.*), *Padma-purāṇa* (*Sṛishṭi-khaṇda, iii,* 4, 5), *and Mārkaṇḍeya-purāṇa* (*xlvi.* 23-5) *state that* fifteen twinklings of the eye make a Kashtha; thirty Kashthas, one Kalā; and thirty Kalās, one Muhurtta.[2] Thirty Muhurttas constitute a day and night of mortals: Thirty such days make a month, divided into two half-months: six months form an Ayana (the period of the sun's progress north or south of the ecliptic): and two Ayanas compose a year. The southern Ayana is a night, and the northern a day, of the gods. Twelve thousand divine years, each composed of (three hundred and sixty) such days, constitute the period of the four Yugas, or ages. They are thus distributed; the Krita age has four thousand divine years; the Treta three thousand; the Dwapara two thousand; and the Kali age one thousand; so these acquainted with antiquity have declared. The period that preceedes a

Yuga is called a Sandhya, and it is of as many hundred years as there are thousand in the Yuga: and the period that follows a Yuga, termed the Sandhyansa, is of similiar duration. The interval between the Sandhya and the Sandhyaṁsa is the Yuga, denominated Krita, Treta, etc The Krita, Treta, Dwapara, and Kali, constitute a great age, or aggregate of four ages: a thousand such aggregates are a day of Brahma, and fourteen Manus reign within that term.

But in another table 30 *kalās* = 1 *kshaṇa*, and 12 *kshaṇas* = 1 *muhūrta*. The Bhāgavata-purāṇa (iii.11) gives us the following scheme:—2 *paramāṇus* = 1 *aṇu*; 3 *aṇus* = 1 *trasa-reṇu*; 3 *trasa-reṇus* = 1 *truṭi*; 100 *trutis* = 1 *vedha*; 3 *vedhas* = 1 *lava*; 3 *lavas* = 1 *nimeṣa*; 3 *nimeṣas* = 1 *kshaṇa*; 5 *kshaṇas* = 1 *kāshṭhā*; 15 *kāshṭhās* = 1 *laghu*; 15 *laghus* = 1 *nādikā*; 2 *nādikās* = 1 *muhūrta*; 6 (or 7) *nāḍikās* = 1 *yāmā* or *prahara* (watch); 4 *praharas* = 1 *day*

Another scheme runs thus :— 1000 *saṇkramas* = 1 *truṭi*: 100 *truṭis* = 1 *tatpara*; 30 *tatparas* = 1 *nimesha*. Another specimen of similar ingenuity is : 60 *kshaṇas* = 1 *lava*; 60 *lavas* = 1 *nimesha*; 60 *nimeshas* = 1 *kāshṭhā*; 60 *kāshṭhās* = 1 *atipala*; 60 *atipaḷas* = 1 *vipala*; 60 *vipalas* = 1 *paḷa*; 60 *palas* = 1 *daṇḍa*: 60 *daṇḍas* = 1 day and night. 60 day-nights = 1 *ṛitu* or season.

The table given by *Bhāskara* (Siddhānta-siromaṇi, i, 19,20) is as follows:—100 *truṭis* = 1 *tatpara*; 30 *tatparas* = 1 *nimesha*; 18 *nimeshas* = 1 *kāshṭhā*; 30 *kāshṭhās* = 1 *kalā*; 30 *kalās* = 1 *ghaṭikā*; 2 *ghaṭikās* = 1 *kshaṇa*; 30 *kshaṇas* = 1 day. Mahāvīra in the Gaṇitasāra-sangraha states that:—7 *uchchhvāsas* (breaths) = 1 *stoka*; 7 *stokas* = 1 *lava*; 38½ *lavas* = 1 *ghaṭi*; 2 *ghaṭīs* = 1 *muhūrta*; *etc*.

The Kauṭilīya (ii. 20) gives different values, viz. 2 *truṭis* = 1 *lava*; 2 *lavas* = 1 *nimesha*; 5 *nimeshas* = 1 *kāshṭhā*; 30 *kāshṭhās* = 1 *kalā*: 40 *kalās* = 1 *nālikā*; 2 *nālikās* = 1 *muhūrta*; 15 *muhūrtas* = 1 day or night, etc.[3]

There are many units of time. The smallest ones are denoted by *Truti, Tatpara, Mātra, Uchchvāsa, Prāṇa, Lava, Kṣaṇa, Nimeṣa, Palan, Kalā* etc.

Ṛgveda mentions that day and night comprise 30 muhrūtas. *Nakṣatras* are mentioned as stars in Ṛgveda. In some places vedic deities are named along the *nakṣatras*.

The principle of the calculation adopted by the astronomical works is different :

6 *Prāṇas*=1 *Vikalā*; (0 *Vikalās*=1 Daṇḍa; 60 *Daṇḍas*=1 sydereal day; Whilst the more ordinery system seems derived from astronomical works, being :

60 *tilas*=1 *Vipala*; 60 *Vipalas*=1 *Pala*; 60 *Palas*=1 *Daṇḍa* or *Ghaṭi*.

FOOT NOTES

[1]This term is also applied to a different and still more protracted period.

[2]In the Mahābhārata, Mokṣa Dharma, it is said that 30 *kalās* and one tenth, or according to a comment, thirty *kalās* and three *kāshaṭhas* make a Muhūrtta.

[3]Some indications of these calculations being in common currency occur in Hindi term *Reṇu* and *Laghu* in Indian horometry (A R. 5.81)